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This report is a part of the program of the National Center for Health Statistics to provide current statistics as baseline data for the evaluation, planning, and administration of health programs. Part I presents data concerning the occupational fields: (1) administration, (2) anthropology and sociology, (3) data processing, (4) basic sciences, (5) biomedical engineering, (6) chiropractic and naturopathy, (7) laboratory, (8) dentistry, (9) dietetics, (10) economic research, (11) environmental control, (12) food and drug protective services, (13) vital statistics, (14) health education, (15) health information and communication, (16) library services, (17) medical records, (18) medicine and osteopathy, (19) midwifery, (20) nursing, (21) occupational therapy, (22) orthotic and prosthetic technology, (23) pharmacy, (24) physical therapy, (25) podiatry, (26) psychology, (27) radiologic technology, (28) secretarial and office services, (29) social work, (30) specialized rehabilitation, (31) speech pathology and audiology, (32) veterinary medicine, (33) vision care, and (34) vocational rehabilitation counseling. Part II presents data concerning inpatient health facilities. A total of 375 primary and alternate job titles are appended. (JK)

ED 033202

Health Resources Statistics

REPORTED FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

1968

U.S. DEPARTMENT OF
HEALTH, EDUCATION, & WELFARE
PUBLIC HEALTH SERVICE
HEALTH SERVICES & MENTAL HEALTH ADMINISTRATION

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Health Resources Statistics

Health Manpower and Health Facilities, 1968

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
HEALTH SERVICES & MENTAL HEALTH ADMINISTRATION
NATIONAL CENTER FOR HEALTH STATISTICS
DECEMBER, 1968
WASHINGTON, D.C.

This second edition of HEALTH RESOURCES STATISTICS, 1968 contains data on health manpower and inpatient health facilities. Subsequent editions will also include statistics on outpatient health facilities and other resources in the health field.

PUBLIC HEALTH SERVICE PUBLICATION NO. 1509
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Our appreciation is extended to each of the many associations, organizations, government agencies, and individuals which contributed to the publication by providing materials and suggestions for the text and tables.

In particular, we should like to thank Mrs. Maryland Y. Pennell (Special Assistant to the Director, Division of Allied Health Manpower) and other staff of the Bureau of Health Manpower for their intensive review of the text and tables of part I which resulted in a number of invaluable suggestions and improvements. We should also like to acknowledge Mrs. Pennell's notable achievement in developing and publishing the prototype for this series when she was Chief of the Health Manpower Statistics Branch, NCHS.

FOREWORD

In 1967, the National Center for Health Statistics (NCHS) of the U.S Public Health Service published its first report on *Health Resources Statistics: Health Manpower, 1965* (PHS Pub. No. 1509). This publication was so enthusiastically received by the public that the NCHS decided to issue new editions annually and enlarge the scope to include data on facilities as well as on manpower. As such, the report becomes a part of the general program of the NCHS to provide current statistics over a wide range of health areas as baseline data for the evaluation, planning, and administration of health programs.

This statistical compendium of the health resources of the Nation provides urgently needed information on health manpower and health facilities. It should be useful to planners, administrators, researchers, and others who are concerned with the development and functioning of national, State, and regional health programs.

I sincerely hope that all those concerned with health resources will find much that is valuable and enlightening in this report. Comments and suggestions for improvement of future editions are welcomed.

THEODORE D. WOOLSEY,
Director.

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PART I

Health Manpower

INTRODUCTION

This edition is the second in the Health Resources Statistics series issued by the National Center for Health Statistics. The first edition, *Health Resources Statistics, 1965*, was published in February 1967 and contained data on health manpower only. The second edition contains statistics on both health manpower and health facilities.

The Health Resources Statistics series are designed to assemble statistics on manpower and facilities in the health field. All of the statistical information presented in the first edition on health manpower have been included in this publication and in some cases expanded. In addition, data have been included on approximately 31,000 inpatient facilities, which include hospitals in the United States with six or more beds, nursing care and related homes with three or more beds, and other inpatient health facilities.

This report incorporates selections of data from many publications, both private and government. Publications and associations cited as sources may provide greater statistical detail and more comprehensive discussions of definitions and concepts than are presented here.

About 3.4 million persons were employed in 1967 in the health professions and occupations identified in this publication (table 1). A total of about 375 primary and alternate job titles are listed in the appendix. Even then, the inventory is incomplete and some types of health workers may have been inadvertently omitted.

Persons who work in these specific health professions and occupations have had special education or training designed to help them function in a health setting. Many other persons perform the business, clerical, and maintenance services essential to the operation of health facilities and agencies, but their occupations are not unique to the health field. (See table 2 and ch. 1.)

It is difficult to determine the number of individuals in each of the health occupations, yet it is desirable to know the total number of persons who have had special education or training and, of this number, the proportion that is in the work force. Information is needed on geographic location; employment status and type of activity; educational background and special training; personal characteristics such as age, race, and sex; and employment characteristics related to the kind and volume of services rendered and the number of years of work experience.

Sources of information on health manpower, presented by occupation, are shown in the chapters that follow. Sources of manpower statistics discussed in this part are related to education, license to practice, certification or registration, association membership, place of employment, and other factors.

Education

A *graduate* or *professional* degree awarded by an educational institution in the United States is positive identification for many professions. The doctorate is usually required for scientists in medical research; the master's degree, for social workers; and a master's degree in public health, for public health educators or nutritionists. Professional degrees clearly identify the physician (M.D. or D.O.), the optometrist (O.D.), the dentist (D.D.S. or D.M.D.), the veterinarian (D.V.M.), and so forth.

Each educational institution maintains a list of the individuals who have been graduated and their levels of degree. The National Center for Educational Statistics compiles statistics on the annual numbers of graduates as reported by schools, colleges, and universities. The 1965–66 data on degrees conferred in fields pertinent to health are shown in table 3 (*1*). The American Public Health Association compiles statistics on the annual numbers of graduates of schools of public health, including the professional categories of the degree recipients (tables 4, 5, and 6).

2/

A file of all graduates in a given field may be compiled from the lists of those persons who have completed approved academic programs. For example, the Association of American Medical Colleges maintains such a file on graduates of U.S. medical schools, by school and year of graduation. The American Association of Colleges of Pharmacy can also identify graduates of its institutions.

The names of all graduates of U.S. schools who have been awarded an M.D. degree are included in the records maintained by the American Medical Association; those with a D.O. degree, by the American Osteopathic Association; those with a D.V.M., by the American Veterinary Medical Association; and those with a D.D.S. or D.M.D., by the American Dental Association. Thus, these associations represent all individuals in the profession, rather than only their members. It is difficult, however, for associations to maintain current information about persons who do not belong to the organization and who will not reply to periodic requests for data on place of employment and type of activity.

Persons with a *baccalaureate* as the highest educational level are not as easy to identify as those with a graduate or professional degree. Occupational therapists, physical therapists, statisticians, and sanitarians are among those whose educational requirement is a bachelor's degree or higher. The educational program may be offered in the form of courses, as a separate department, or as a separate school. Sometimes the persons are reported as graduates when they have completed their academic work, but a period of supervised clinical practice may be required for professional recognition. This is the situation, for example, for occupational therapists.

Below the baccalaureate level but still in an educational setting are the increasing numbers of persons enrolled in community colleges and vocational schools. A 2-year course leads to an associate degree or certificate for registered nurses and for dental hygienists. A 1- or 1½-year course is the usual program for practical nurses and for medical record technicians.

The U.S. Office of Education, Division of Vocational and Technical Education has completed two surveys of health occupations curriculums. These 1964–65 and 1965–66 findings cover fields of training for persons who render supportive services to the health professions.

Manpower information on persons who have received *on-the-job training* can only be obtained by surveys or censuses of the general population or by surveys of the kinds of establishments in which they work. On-the-job training is usual for dental assistants and dental laboratory technicians who have completed their high school education prior to receiving inservice training; however, formal education programs are being developed in both areas.

Persons who have been educated outside of the United States and have later come to this country for additional training or for employment are hard to locate. Increasing numbers of *foreign-trained* physicians and nurses are entering this country; to know how long they stay or when they leave is difficult. State licenses, required for employment, are not required for certain types of training even though the individuals provide patient care while serving internships.

License or Permit

A license or permit to practice within a State, issued by a State agency, is a means of identifying some health personnel. For example, this is the best source of statistics on registered nurses (R.N.) and on practical nurses (L.P.N.).

About 25 occupations in the health field are licensed in one or more States. All States and the District of Columbia require that the following health personnel have a license to practice: dental hygienists, dentists, environmental health engineers, optometrists, pharmacists, physicians (M.D. and D.O.), podiatrists, practical nurses, registered nurses, and veterinarians. All except a few States license chiropractors and physical therapists. About 20 to 30 States license midwives, opticians, psychologists, and sanitarians or sanitary inspectors. Fewer than one-third of the States license clinical laboratory directors including bioanalysts, clinical laboratory personnel such as medical technologists or technicians, naturopaths and other drugless healers, and social workers. Ten States license nursing home administrators. Health department administrators, hospital administrators, and radiologic technologists (X-ray technicians) are licensed in one State each.

The Council of State Governments, under contract with the National Center for Health

Statistics, has conducted a survey on policies and practices of the State licensing agencies. The survey provides information on licensing qualifications, reciprocity, and other related matters, as well as the numbers of licenses in effect. The findings have been compiled and published by the National Center for Health Statistics (*2*).

A 1966 Inventory of Registered Nurses, conducted by the American Nurses' Association and financed by the Public Health Service, will provide information on the number of registered nurses in the country who maintain their license to practice. Preliminary findings will be available later in 1968.

Current studies are underway of several types of licensed personnel, including dentists, pharmacists, registered nurses, practical nurses, ophthalmologists, optometrists, and dispensing opticians. These surveys are being conducted either by the National Center for Health Statistics, or by professional associations or boards and financed by the Public Health Service. Basic data for the above surveys, such as place of employment, type of activity, specialization, educational preparation, year of birth, and sex, are obtained along with the application forms for renewal of licenses.

The information thus provided is relatively complete for all persons active at the time of renewal of the license to practice. However, it must be taken into account that for some occupations there is considerable variation in qualifications from one State to another, and the spread in renewal dates adds confusion to the elimination of duplicates licensed in more than one jurisdiction.

Certification or Registration

Within some professions there are specialty boards, certification boards, and/or registries established by the profession itself for the purpose of distinguishing quality. Persons who meet certain requirements of education, experience, and competency, and pass an examination given by the board may use specific professional designations. For example, MT (ASCP) indicates that the medical technologist has been registered by the Board of Registry of Medical Technologists of the American Society of Clinical Pathologists.

These organizations not only qualify persons who meet their standards but they usually know of persons working toward qualification. They maintain lists of all persons registered to date. The lists may appear in published form, as in *The Directory of Medical Specialists* (*3*), which provides information on all physicians who are diplomates of the 19 American Specialty Boards.

Association Membership

To become a member of a professional association or society implies having met certain qualifications of education and/or experience. Associations usually maintain records on current and past members (who may decide to reactivate their membership at a later date). Their mailing lists provide information on geographic location (as in the case of the American Dietetic Association and the American Physical Therapy Association). Sometimes information on employment status and other items obtained at the time of renewal of membership is included (as in the case of the American Speech and Hearing Association). Membership lists may be published for general distribution or limited to paid members.

Association memberships may represent nearly all persons in the specific health field (as in the case of the American Occupational Therapy Association) or only a small portion of those carrying the job title (as in the case of the American Society of Radiologic Technologists). In the latter instance, persons who could qualify for membership do not choose to belong, for various reasons, while many others working in the field do not have the qualifications essential for membership.

Mailing lists of selected professional associations are circularized in connection with the National Register of Scientific and Technical Personnel, a responsibility of the National Science Foundation. The sixth biennial registration of scientists conducted in 1966 included physical scientists in the fields of chemistry, earth sciences, meterology, physics, and mathematics; life scientists in the fields of agriculture and biology; as well as scientists in psychology, statistics, economics, sociology, anthropology, linguistics, and other fields. Nearly 243,000 individuals responded with data about field of science, highest degree, age, type of employer, work activity, years of professional experience, and salary (*4*). The 90,000 doctorates are estimated to be about 90 percent of the Nation's science doctorates. The 1968 circularization is in progress, with release of summary characteristics and salary data scheduled for the end of 1968.

Place of Employment

Agencies and establishments that provide health services are another source of manpower statistics. Examples are the occupational classification of persons employed by the Federal Government (tables 7 and 8) and by State and local health departments (table 9).

The U.S. Department of Labor, Bureau of Labor Statistics, has published information on numbers of health personnel and other types of employees in the surveys of scientific and technical personnel employed by State governments in 1964 and by local governments in 1963 (*5*). This study was repeated in 1967 and preliminary data are expected to be published later in 1968.

A survey of manpower resources in hospitals was conducted by the American Hospital Association (AHA) and financed by the Public Health Service. Information was published on the numbers of full- and part-time employees in hospitals in April 1966 for about 35 categories (*6*). Summary tabulations of personnel in hospitals are shown in table 10. Preliminary findings from a companion survey of manpower resources in non-AHA hospitals and extended care facilities, conducted by the PHS Division of Nursing, are presented in table 11.

The National Center for Health Statistics conducts nationwide surveys of nursing homes, homes for the aged, and other establishments providing nursing, personal, and domiciliary care to the aged and infirm. Comprehensive and current statistics on staffing of these facilities are reported in Vital and Health Statistics, Series 12 of the Center's publications. For some of the 1967 survey findings, see chapter 1.

The National Institute of Mental Health conducted a survey of professional personnel employed in 1963 in mental health establishments. The findings on staffing by psychiatrists, psychologists, psychiatric social workers, and psychiatric nurses appear in the series of *Mental Health Manpower* current statistical and activities reports, begun during the period January–March 1964 and completed in April 1966.

In connection with the comprehensive program of health insurance for the aged (Medicare), the Social Security Administration has published information on the number of participating home health agencies by type and State, as of March 1967 (*7*). Information will be available in the fall of 1968 on the staffing of those agencies which provide skilled nursing and other therapeutic care to persons who require medical attention but could be cared for at home.

Other Sources

The *1960 Census of Population* provides statistics on the cross-classification of occupation by industry for employed persons. The statistics are based on a 5-percent sample of the population (*8*). Special tabulations compiled by the Bureau of the Census, have been published by the Public Health Service (*9*). The summary table for the Nation as a whole is reproduced here as table 2, to show the many diverse occupations within the health services industry.

Commercial "mailing" houses compile names and addresses of individuals from a wide variety of sources, including those available from associations or State registrations. They sell their lists or provide mailing services. Other sources of identification of health personnel include occupational listings in telephone books and city directories.

Public Health Personnel

Tables on public health personnel and on employees of government health departments have been included in the introduction, rather than in a separate chapter. Public health, while often treated as an independent activity within the health field, utilizes most of the individual types of health manpower described elsewhere in this publication.

Reliability of Estimates

The estimates of existing manpower resources cited in the chapters to follow differ widely in reliability. Where data are based on surveys, the estimate should be fairly reliable. Other estimates are the best available, but may be off by as much as 50 percent. To some extent the relative accuracy of the data can be determined by the context in which the figures are introduced. Furthermore, in the case of some health occupations, it will be clear that the data are incomplete, and it is likely that there is a direct correlation between the amount of data available and the reliability. As the "state of the arts" improves, both the amount and quality of statistics will increase.

The following guidelines may also be of value in judging reliability:

1. The greatest reliability can be expected for those occupations for which a graduate or professional degree provides positive identification. If this circumstance applies and there is also an accounting system established to identify graduates, introduce immigrants to the profession from overseas, eliminate deaths from the file, and periodically survey all or samples of the list to learn about current activity, then the statistics are likely to be highly reliable.
2. The statistics on numbers of graduates with specific advanced degrees are probably more reliable than the numbers active in the profession or occupation.
3. Where no more than the bachelor's degree is required for entrance into the field, the data are apt to be less reliable. Where the necessary training is below the baccalaureate level, then even less confidence can be placed in the figures coming from educational sources.
4. If the data on numbers in the health occupation come from licensure information, the statistics are probably of a reasonably high dependability. However, much will depend upon completeness of coverage, uniformity of licensing practices, and success in eliminating duplications between jurisdictions.
5. Statistics from specialty boards, certification boards, and registries may be entirely accurate counts of persons deemed to meet the requirements of listing. They obviously are not intended to cover the profession completely and may represent only a minority working in the specialized field.
6. Association membership used alone as a guide to manpower resources should be treated with very great caution, although such a generalization is subject to exceptions. Some associations are quite successful in bringing in a high proportion of all workers in the field. Others are weak or in competition with other associations.
7. Surveys of establishments are capable of producing highly reliable results for persons working in those establishments, but there are problems of obtaining complete coverage of the establishments. Each survey must be judged on its merits. It is clear, however, that such surveys miss some people with the appropriate training who are not currently employed.
8. The same remarks apply to statistics on occupation from previous censuses of the population. Here there have been the additional problems that household respondents' reports and coding practices have made it difficult to sort out properly the detailed categories of health personnel that are of interest.

The chapters that follow indicate the best estimates known to the Public Health Service, though it is acknowledged that in some instances these are little better than informed guesses. It will be the task of the National Center for Health Statistics, working with other agencies and professional associations, to update and improve upon the estimates that will be found herein.

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(9) Prindle, R. A., and Pennell, M. Y.: Industry and occupation data from 1960 census by State. *Health Manpower Source Book 17*. PHS Pub. No. 263. U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1963.

Table 1. ESTIMATED PERSONS EMPLOYED IN SELECTED OCCUPATIONS WITHIN EACH HEALTH FIELD: 1965 AND 1967

Health field and occupation	Workers	
	1965	1967
Total [1]	2,840,800 to 2,861,100	3,375,300 to 3,410,600
Administration of health services	31,500 to 37,000	39,000 to 44,000
Administrator, program analyst program representative	31,500 to 37,000	39,000 to 44,000
Anthropology and sociology	600 to 800	1,000
Anthropologist—cultural and physical	400	600
Sociologist—medical	200 to 400	400
Automatic data processing in the health field	300	500
Systems analyst	300	500
Basic sciences in the health field	47,000	52,000
Research scientist (other than physician, dentist, veterinarian)	[2] 47,000	52,000
Biomedical engineering	7,500	9,000
Biomedical engineer	2,500	3,000
Biomedical engineering technician	5,000	6,000
Chiropractic and naturopathy	16,000 to 18,000	[3] 16,000 to 18,000
Chiropractor, naturopath	[2] 16,000 to 18,000	16,000 to 18,000
Clinical laboratory services	85,000 to 95,000	100,000
Clinical laboratory scientist	3,500	4,000
Clinical (medical) laboratory technologist [4]	35,000	40,000
Clinical laboratory technician and aide	46,500 to 50,000	56,000
Dentistry and allied services	223,400	235,700
Dentist	[5] 93,400	98,700
Dental hygienist	[2] 13,500	[6] 15,000
Dental assistant	91,000	95,000
Dental laboratory technician	25,500	27,000
Dietetic and nutritional services	36,000	36,000
Dietitian and nutritionist	30,000	[3] 30,000
Dietary technician, food service supervisor	[2] 6,000	6,000

See footnotes at end of table.

Table 1. ESTIMATED PERSONS EMPLOYED IN SELECTED OCCUPATIONS WITHIN EACH HEALTH FIELD: 1965 AND 1967—Continued

Health field and occupation	Workers	
	1965	1967
Economic research in the health field	500	500 to 600
Economist—health	500	500 to 600
Environmental control	35,000	35,000
Environmental engineer	9,000	[3] 9,000
Industrial hygienist	2,300	[3] 2,300
Other environmental program specialists	8,700	[3] 8,700
Sanitarian and sanitarian technician	15,000	[3] 15,000
Food and drug protective services	16,500	21,500
Food technologist	15,000	20,000
Food-and-drug analyst and inspector	1,500	1,500
Health and vital statistics	1,400 to 2,400	2,400
Health statistician, vital-record registrar, demographer	1,400 to 2,400	[3] 2,400
Health education	16,700	19,800
Public health educator	1,700	1,800
School health educator, coordinator	15,000	18,000
Health information and communication	3,500 to 4,500	4,500
Health information specialist and science writer	1,000 to 2,000	[3] 2,000
Health technical writer	[2] 2,000	[3] 2,000
Medical illustrator	500	[3] 500
Library services in the health field	8,000	8,000
Medical librarian	3,000	[3] 3,000
Medical library assistant	5,000	[3] 5,000
Medical records	33, 000	37, 000
Medical record librarian	10, 000	12, 000
Medical record technician	[2] 23, 000	25, 000
Medicine and osteopathy	288, 700	305, 500
Physician (M.D.)	[5] 277, 600	294, 100
Physician (D.O.)	[5] 11, 100	11, 400
Midwifery	5, 700	4, 700
Lay midwife	[2] 5, 700	4, 700
Nursing and related services	1, 409, 000	1, 791, 000
Registered nurse	621, 000	659, 000
Practical nurse	282, 000	320, 000
Nursing aide, orderly, attendant	500, 000	800, 000
Home health aide	6, 000	12, 000

See footnotes at end of table.

Table 1. ESTIMATED PERSONS EMPLOYED IN SELECTED OCCUPATIONS WITHIN EACH HEALTH FIELD: 1965 AND 1967—Continued

Health field and occupation	Workers	
	1965	1967
Occupational therapy	10,000	11,000 to 12,000
Occupational therapist	6,000	6,500
Occupational therapy assistant, aide	[2] 4,000	4,500 to 5,500
Orthotic and prosthetic technology	3,300	3,500
Orthotist and prosthetist	3,300	3,500
Pharmacy	123,000	128,000
Pharmacist	[2] 117,400	122,400
Pharmacy aide	[2, 7] 5,600	[7] 5,600
Physical therapy	17,000	19,000 to 21,000
Physical therapist	12,000	13,000
Physical therapy assistant, aide	[2] 5,000	6,000 to 8,000
Podiatry	7,600	8,000
Podiatrist	7,600	8,000
Psychology	9,000	9,000
Psychologist—clinical, counseling, and other health	9,000	[3] 9,000
Radiologic technology	70,000	75,000 to 100,000
Radiologic (X-ray) technologist, technician	70,000	75,000 to 100,000
Secretarial and office services in the health field	200,000	250,000
Secretary, office assistant	[2] 200,000	250,000
Social work	19,000	21,700
Clinical social worker	17,500	20,200
Clinical social work assistant	[7] 1,500	[7] 1,500
Specialized rehabilitation services	5,300 to 5,900	8,600 to 8,800
Corrective therapist	700 to 800	1,000 to 1,200
Educational therapist	500	[3] 500
Manual arts therapist	900	[3] 900
Music therapist	1,500	2,000
Recreational therapist	1,600 to 2,000	4,000
Homemaking rehabilitation consultant	100 to 200	200
Speech pathology and audiology	14,000	16,000
Speech pathologist and audiologist	14,000	16,000
Veterinary medicine	22,500	24,200
Veterinarian	[5] 22,500	24,200

See footnotes at end of table.

Table 1. ESTIMATED PERSONS EMPLOYED IN SELECTED OCCUPATIONS WITHIN EACH HEALTH FIELD: 1965 AND 1967—Continued

Health field and occupation	Workers	
	1965	1967
Vision care	40,400	40,400
Optometrist	17,000	[3] 17,000
Optician	8,000	[3] 8,000
Vision care technician	15,000	[3] 15,000
Orthoptist	400	[3] 400
Vocational rehabilitation counseling	6,200	7,800
Vocational rehabilitation counselor	[2] 6,200	7,800
Miscellaneous health services	28,200	34,000
Inhalation therapy technician	5,000	7,000
Electrocardiograph technician	[2] 5,000	6,000
Electroencephalograph technician	1,200	2,000
Surgical aide	[2] 17,000	19,000

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[1] Each occupation is counted only once. For example, all physicians are in medicine and osteopathy.

[2] Estimate not previously published or revised from that shown in PHS Pub. No. 1509.

[3] 1965 estimate repeated in absence of sufficient information on which to base revision.

[4] With bachelor's degree or ASCP certified.

[5] Estimates revised to show active rather than total for dentist, physician, and veterinarian.

[6] Preliminary estimate.

[7] Limited to hospital employees in 1966.

Source: National Center for Health Statistics: *Health Manpower, United States, 1965-1967.* PHS Pub. No. 1000—Series 14-No. 1. Public Health Service. Washington. U.S. Government Printing Office. November, 1968.

Table 2. OCCUPATION OF PERSONS EMPLOYED IN THE CIVILIAN LABOR FORCE: 1960

Detailed occupation [1]	All industries	Health services	Percent health
All occupations	64, 646, 563	2, 589, 253	4. 0
Professional, technical, and kindred	7, 223, 241	1, 167, 218	16. 2
Accountants and auditors	469, 702	4, 077	. 9
Chiropractors	13, 853	13, 630	98. 4
Clergymen	199, 701	2, 275	1. 1
Dentists	86, 887	85, 263	98. 1
Dietitians and nutritionists	26, 470	18, 190	68. 7
Engineers, technical	859, 547	2, 775	. 3
Lawyers and judges	208, 696	1, 696	. 8
Librarians	84, 332	6, 918	8. 2
Natural scientists:			
Biological scientists	13, 415	4, 036	30. 1
Chemists	81, 120	3, 133	3. 9
Physicists and other natural scientists	53, 650	585	1. 1
Nurses, professional	581, 289	528, 771	91. 0
Nurses, student professional	57, 746	57, 746	100. 0
Optometrists	16, 205	13, 073	80. 7
Osteopaths	4, 081	3, 861	94. 6
Personnel and labor relations workers	98, 257	4, 379	4. 5
Pharmacists	92, 233	6, 504	7. 1

See footnotes at end of table.

Table 2. OCCUPATION OF PERSONS EMPLOYED IN THE CIVILIAN LABOR FORCE: 1960—Con.

Detailed occupation [1]	All industries	Health services	Percent health
Photographers	50, 735	1, 529	3. 0
Physicians and surgeons	229, 671	218, 301	95. 0
Public relations men and publicity writers	30, 593	722	2. 4
Recreation and group workers	37, 487	1, 507	4. 0
Religious workers	57, 069	1, 386	2. 4
Social and welfare workers, except group	95, 103	9, 795	10. 3
Social scientists:			
Psychologists	11, 694	3, 522	30. 1
Statisticians and actuaries	20, 711	743	3. 6
Teachers (elementary, secondary, n.e.c.)	1, 670, 810	3, 666	. 2
Technicians, medical and dental	138, 813	127, 947	92. 2
Technicians, electrical engineering and other	277, 905	1, 589	. 6
Therapists and healers (n.e.c.)	36, 568	25, 272	69. 1
Veterinarians	15, 205	382	2. 5
All other	1, 603, 693	13, 945	. 9
Managers, officials, and proprietors	7, 916, 062	50, 092	. 6
Credit men	46, 592	962	2. 1
Purchasing agents and buyers (n.e.c.)	103, 191	2, 262	2. 2
All other	7, 766, 279	46, 868	. 6
Clerical and kindred workers	9, 303, 231	399, 703	4. 3
Agents (n.e.c.)	158, 610	1, 511	1. 0
Attendants, physician's and dentist's office	72, 171	70, 607	97. 8
Bookkeepers	916, 453	21, 622	2. 4
Cashiers	471, 878	5, 420	1. 1
Fileclerks	132, 925	4, 265	3. 2
Messengers and office boys	59, 752	2, 311	3. 9
Office machine operators	304, 952	3, 119	1. 0
Payroll and timekeeping clerks	105,917	1,768	1. 7
Receptionists	134,866	55,286	41. 0
Secretaries	1,463,731	101,339	6. 9
Shipping and receiving clerks	278,210	645	. 2
Stenographers	269,759	9,289	3. 4
Stockclerks and storekeepers	329,661	6,899	2. 1
Telephone operators	354,200	14,706	4. 2
Typists	521,240	19,337	3. 7
All other	3,728,906	81,579	2. 2
Salesworkers	4,643,784	1,838	0. 0
Craftsmen, foremen, and kindred workers	8,753,468	67,742	. 8
Bakers	106,535	2,028	1. 9
Carpenters	822,803	4,416	. 5
Electricians	339,053	3,280	1. 0
Foremen (n.e.c.)	1,174,314	3,709	. 3
Inspectors (n.e.c.)	100,574	5,340	5. 3
Mechanics and repairmen	2,221,844	25,810	1. 2
Opticians, and lens grinders and polishers	20,406	1,772	8. 7
Painters, construction and maintenance	376,022	5,796	1. 5
Plumbers and pipe fitters	306,567	2,885	. 9
Stationary engineers	267,415	9,650	3. 6
All other	3,017,935	3,056	. 1

See footnotes at end of table.

Table 2. OCCUPATION OF PERSONS EMPLOYED IN THE CIVILIAN LABOR FORCE: 1960—Con.

Detailed occupation [1]	All industries	Health services	Percent health
Operatives and kindred workers	11,920,442	62,441	0.5
Deliverymen and routemen	422,622	826	.2
Dressmakers and seamstresses, except factory	119,965	5,574	4.6
Laundry and drycleaning operatives	385,064	32,315	8.4
Meatcutters, except slaughter and packing	180,302	1,479	.8
Photographic process workers	40,747	509	1.2
Stationary firemen	88,314	5,726	6.5
Taxicab drivers and chauffeurs	162,881	2,331	1.4
Truck and tractor drivers	1,555,793	2,658	.2
All other	8,964,754	11,023	.1
Service workers, including household	7,171,837	799,887	11.2
Attendants, hospital and other institution	391,136	365,690	93.5
Attendants, professional and personal service	70,520	2,156	3.1
Barbers	179,670	1,190	.7
Chambermaids and maids	167,913	34,557	20.6
Charwomen and cleaners	182,279	21,846	12.0
Cooks, except private household	563,932	47,234	8.4
Counter and fountain workers	157,415	10,828	6.9
Elevator operators	73,500	5,388	7.3
Hairdressers and cosmetologists	305,858	1,366	.4
Housekeepers and stewards	146,644	29,845	20.4
Janitors and sextons	596,052	26,156	4.4
Kitchen workers (n.e.c.)	300,977	66,655	22.1
Midwives	896	896	100.0
Porters	142,718	12,219	8.6
Practical nurses	207,966	144,045	69.3
Protective service workers	688,256	6,604	1.0
Waiters and waitresses	823,864	11,549	1.4
All other	2,172,241	11,663	.5
Laborers	4,532,950	12,172	.3
Gardeners, except farm, and groundskeepers	195,092	3,109	1.6
All other	4,337,858	9,063	.2
Occupation not reported	3,181,548	28,160	.9

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[1] Selection among the 297 specific occupation categories of those in which at least 500 persons were employed in the health-service industry. Some health occupations are not treated as specific categories. Based on 5 percent sample.

Source: Divisions of Public Health Methods, Dental Public Health and Resources, and Nursing: Manpower in the 1960's. *Health Manpower Source Book 18.* PHS Pub. No. 263, Sec. 18. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1964. Based on 1960 Census of Population.

Table 3. EARNED DEGREES CONFERRED, BY SELECTED FIELD OF STUDY AND LEVEL OF DEGREE, FOR 1,549 INSTITUTIONS: JULY 1, 1965, THROUGH JUNE 30, 1966

Major field of study [1]	Bachelor's	First professional requiring 6 years or more	Master's	Doctor's
All fields	**524, 117**	**31, 496**	**140, 772**	**18, 239**
Agriculture	**5, 730**	**—**	**1, 363**	**537**
Food science	240	—	123	57
Architecture	**2, 471**	**198**	**702**	**12**
Biological sciences	**27, 010**	**38**	**4, 235**	**2, 097**
Premedical, predental, and preveterinary sciences	3, 183	38	11	1
Biology, general	16, 866	—	1, 546	226
Botany, general	473	—	316	203
Zoology, general	4, 119	—	660	293
Anatomy and histology	65	—	86	67
Bacteriology, virology, mycology, parasitology, microbiology	996	—	385	242
Biochemistry	264	—	231	315
Biophysics	13	—	25	56
Cytology	—	—	6	3
Ecology	3	—	6	4
Embryology	—	—	4	11
Entomology	170	—	213	127
Genetics	42	—	65	71
Nutrition	22	—	116	26
Optometry (preprofessional)	350	—	—	—
Pathology	—	—	65	35
Pharmacology	3	—	75	88
Physiology	121	—	172	129
Plant pathology	28	—	83	80
Plant physiology	—	—	16	31
Biological sciences, field of study not identified	292	—	154	89
Business and commerce	**63, 500**	**—**	**12, 988**	**387**
Computer science and systems analysis	**89**	**—**	**238**	**19**
Education	**118, 399**	**22**	**50, 478**	**3, 063**
Health education, separate curriculum	416	1	201	1
Education of the partially sighted	3	—	2	—
Education of the blind	23	—	18	—
Education of the mentally retarded	841	3	520	11
Education of the emotionally disturbed	64	—	29	—
Education of the deaf	109	—	131	1
Speech and hearing	2, 067	—	632	36
Education of the crippled	72	—	24	—
Education of exceptional children	486	—	913	50
Home economics education	4, 507	—	450	18
Rehabilitation counselor training	33	—	141	1
Engineering	**35, 815**	**—**	**13, 678**	**2, 304**
Environmental health and sanitary engineering	11	—	181	23
English and journalism	**42, 321**	**2**	**6, 788**	**714**
Fine and applied arts	**18, 677**	**28**	**5, 019**	**476**
Folklore	**5**	**—**	**14**	**3**
Foreign languages and literature	**15, 519**	**8**	**3, 631**	**512**
Forestry	**1, 443**	**23**	**303**	**51**
Geography	**1, 934**	**—**	**370**	**58**

See footnotes at end of table.

Table 3. EARNED DEGREES CONFERRED, BY SELECTED FIELD OF STUDY AND LEVEL OF DEGREE, FOR 1,549 INSTITUTIONS: JULY 1, 1965, THROUGH JUNE 30, 1966—Continued

Major field of study [1]	Bachelor's	First professional requiring 6 years or more	Master's	Doctor's
Health professions	**15, 054**	**13, 253**	**2, 867**	**251**
Chiropody or podiatry	36	136	—	—
Dental hygiene	285	—	14	—
Dentistry, D.D.S. and D.M.D. only	—	3, 264	—	—
Hospital administration	15	19	276	1
Medical technology	2, 139	—	7	—
Medicine, M.D. only	—	7, 720	—	—
Nursing and/or public health	7, 831	—	863	1
Occupational therapy	462	—	14	—
Optometry	—	380	16	5
Osteopathy	—	360	2	—
Pharmacy	3, 311	452	187	78
Physical therapy, physiotherapy	771	—	27	—
Public health	89	—	817	54
Radiologic technology	27	—	2	—
Veterinary medicine, D.V.M. only	—	922	—	—
Clinical dental sciences	—	—	310	9
Clinical medical sciences	—	—	148	41
Clinical veterinary medical sciences	—	—	63	35
Health professions, field of study not identified	88	—	121	27
Home economics	**5, 724**	**—**	**740**	**54**
Foods and nutrition	660	—	118	14
Institution management, institution administration	251	—	24	—
Law (LL.B., J.D., or higher degrees)	**245**	**13, 442**	**780**	**29**
Library science	**619**	**23**	**3, 916**	**19**
Mathematical subjects	**20, 090**	**3**	**4, 772**	**782**
Mathematics	19, 842	3	4, 387	676
Statistics	248	—	385	106
Merchant marine (deck officer only)	**181**	**—**	**—**	**—**
Military, naval, or air force science	**1, 798**	**—**	**—**	**—**
Philosophy	**5, 024**	**12**	**613**	**203**
Physical sciences	**17, 185**	**1**	**4, 992**	**3, 045**
Chemistry	9, 735	—	1, 822	1, 533
Pharmaceutical chemistry	—	—	17	38
Physics	4, 608	1	1, 949	973
Psychology	**17, 022**	**—**	**2, 530**	**1, 046**
Clinical psychology	—	—	108	75
Counseling psychology	—	—	84	18
Social psychology	53	—	11	57
Rehabilitation counselor training	—	—	109	3
Psychology, all others	109	—	272	170
Records management	**98**	**—**	**—**	**—**
Religion	**4, 036**	**4, 443**	**1, 946**	**333**
Social sciences	**93, 669**	**—**	**16, 460**	**2, 158**
Anthropology	1, 503	—	297	98
Economics (excluding agricultural economics)	11, 585	—	1, 528	458
Sociology	15, 203	—	981	244
Social work, social administration, social welfare	1, 664	—	3, 912	64
Trade and industrial training	**2, 357**	**—**	**44**	**11**
Broad general curriculums and miscellaneous fields	**8, 102**	**—**	**1, 305**	**75**

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[1] All fields listed in the OOE publication are shown here, as well as all subfields for biological sciences, health professions, mathematical subjects and psychology. Other subfields have been selected as being pertinent to health.

Source: National Center for Educational Statistics: *Summary Report on Bachelor's and Higher Degrees Conferred During the Year 1965-66.* OE 54013A-66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968. Data for United States, Canal Zone, Puerto Rico, and the Virgin Islands.

Table 4. DEGREES IN PUBLIC HEALTH AWARDED BY U.S. SCHOOLS OF PUBLIC HEALTH: 1960–61 THROUGH 1966–67[1]

Academic year	Total	Bachelor's	Master's	Doctor's	Academic year	Total	Bachelor's	Master's	Doctor's
1966–67			975	71	1962–63	906	137	740	29
1965–66	1, 151	[2] 72	998	81	1961–62	663	87	547	29
1964–65	1, 140	110	978	52	1960–61	691	99	565	27
1963–64	988	119	808	61					

[1] Data prior to the academic year 1962–63 exclude the University of Puerto Rico.

[2] Data from the individual schools.

Source: U.S. Department of Health, Education, and Welfare, Public Health Service: *Third National Conference on Public Health Training, August 16–18, 1967, Report to the Surgeon General.* PHS Pub. No. 1728. Washington. U.S. Government Printing Office, 1967.

Table 5. LOCATION AND OWNERSHIP OF SCHOOLS OF PUBLIC HEALTH AND NUMBERS OF GRADUATES: 1966–67

Location	School	Ownership	Graduates		
			Bachelor's degree	Master's degree	Doctor's degree
	Total, 15 schools[1]		[2] 72	975	71
Calif.	University of California, Berkeley	Public	22	176	3
	University of California, Los Angeles	do.	24	112	7
Conn.	Yale University, New Haven	Private	—	41	1
Hawaii	University of Hawaii, Honolulu	Public	—	11	—
La.	Tulane University, New Orleans	Private	—	54	6
Md.	Johns Hopkins University, Baltimore	do.	—	76	20
Mass.	Harvard University, Boston	do.	—	69	7
Mich.	University of Michigan, Ann Arbor	Public	4	87	4
Minn.	University of Minnesota, Minneapolis	do.	—	114	1
N.Y.	Columbia University, New York	Private	—	75	2
N.C.	University of North Carolina, Chapel Hill	Public	6	67	13
Pa.	University of Pittsburgh, Pittsburgh	Private	—	53	7
P.R.	University of Puerto Rico, San Juan	Public	16	40	—

[1] Excludes newly established schools of public health at the University of Oklahoma in Norman, and at Loma Linda University in Loma Linda, Calif., and 2 schools in Canada that awarded 119 master's and 4 doctor's degrees.

[2] The bachelor's degrees awarded were for the school year 1965–66, data for 1966–67 were not available.

Source: Troupin, J. L.: *Schools of Public Health in the United States and Canada, for the Year Ending June 1967.* New York. American Public Health Association (mimeo). 8th annual report.

Table 6. PROFESSIONAL CATEGORY OF GRADUATES OF SCHOOLS OF PUBLIC HEALTH, BY GEOGRAPHIC SOURCE AND RECEIPT OF U.S. PUBLIC HEALTH SERVICE TRAINEESHIPS: 1966–67

Professional category	Total	Geographic source			Recipients of U.S. PHS traineeships
		U.S.A.	Canada	Other	
Total	[1] 1,169	[2] 851	95	223	[3] 560
Physicians	352	207	27	118	103
Educators, health educators	119	78	25	16	55
Nurses	121	111	4	6	92
Administrators	103	98	4	1	45
Sanitarians	44	40	—	4	29
Bacteriologists, laboratory scientists	63	38	8	17	31
Statisticians	52	43	—	9	36
Engineers	49	38	2	9	22
Dietitians, nutritionists	46	33	5	8	20
Veterinarians	21	16	—	5	10
Dentists	40	25	9	6	21
Chemists, biochemists	26	17	3	6	16
Social workers	21	19	—	2	15
Biologists, entomologists	27	24	—	3	19
Physicists	20	18	—	2	14
Physical therapists	6	6	—	—	5
Anthropologists, psychologists, sociologists	15	10	2	3	8
Industrial hygienists	8	7	—	1	4
Pharmacists	23	12	4	7	9
Accountants	4	2	2	—	—
Other [4]	9	9	—	—	6

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[1] Includes 1,094 master's degrees (M.P.H., D.P.H., M.S.P.H., M.S. Hyg., M.H.A., and other master's) and 75 doctor's degrees (D.P.H., Sc. D., and Ph. D.). The 12 schools in the United States awarded 1,006 degrees; the 1 school in Puerto Rico, 40 degrees; the 2 schools in Canada, 123 degrees (119 master's and 4 doctor's degrees).

[2] Includes 811 graduates from 50 States and the District of Columbia, 38 from Puerto Rico, and 1 from the Virgin Islands, and 1 from another U.S. possession.

[3] The other 609 graduates were sponsored as follows: 224, own government or own employer; 13, AID; 48, other U.S. Government; 40 WHO; 28, fund or foundation; 182, self-sponsored; 74, other.

[4] Includes 1 lawyer, 1 physiologist, 1 dental hygienist, 1 journalist, 2 economists, 2 medical record librarians, and 1 optometrist.

Source: Troupin, J. L.: *Schools of Public Health in the United States and Canada, for the Year Ending June 1967*. New York. American Public Health Association (mimeo). 8th annual report.

Table 7. OCCUPATIONAL CLASSIFICATION OF FULL-TIME FEDERAL WHITE-COLLAR EMPLOYEES, BY SELECTED AGENCIES: OCTOBER 31, 1966

GS series [1]	Occupational series	Public Health Service, 1966	All Federal agencies, 1966 [2]	Selected agencies, 1966		
				Department of Defense	Department of Health, Education, and Welfare	Veterans' Administration
	All occupations	[3] 25, 510	1, 837, 062	599, 461	90, 599	114, 087
000–099	Miscellaneous (n.e.c.)	238	38, 917	22, 172	329	1, 589
100–199	Social science, psychology, and welfare:					
101	Social science	78	1, 201	42	323	201
110, 119	Economics	9 (—)	4, 253 (117)	151	41	2
180, 181	Psychology	187 (18)	2, 035 (156)	631	243	1, 006
184	Sociology	13	22	—	15	—
185	Social work	82	2, 101	33	127	1, 682
188	Recreational therapist	15	2, 025	1, 280	29	642
(100)	Other occupations within group.	37	20, 092	3, 630	10, 076	30
200–299	Personnel administration and industrial relations.	439	33, 785	19, 696	985	1, 324
300–399	General administrative, clerical, and office services:					
330–334	Digital computer systems	254	19, 619	14, 326	957	494
340	Program management	6	2, 842	444	63	133
341	Administrative assistant and officer.	394	9, 444	3, 278	691	331
359, 362	Electric accounting machine	81 (38)	5, 289 (877)	3, 868	315	264
(300)	Other occupations within group.	7, 648	401, 162	196, 870	31, 572	26, 414
400–499	Biological sciences:					
401, 404	Biology	1, 446 (1, 003)	5, 667 (4, 432)	861	1, 560	722
403	Microbiology	305	1, 382	451	454	222
405	Pharmacology	58	194	36	130	11
413	Physiology	51	270	95	56	32
414	Entomology	30	700	74	36	—
493	Home economics (nutrition)	13	262	25	42	—
(400)	Other occupations within group.	53	32, 585	433	69	17
500–599	Accounting and budget	763	108, 438	46, 117	2, 518	3, 790
600–699	Medical, hospital, dental, and public health:					
602	Medical officer	471	9, 689	[4] 445	[5] 3, 674	[5] 5, 294
605–621	Nurse	4, 852 (2, 523)	60, 892 (37, 427)	[4] 8, 625	[5] 6, 997	[5] 44, 279
630	Dietitian	70	1, 113	10	170	924
631	Occupational therapist	27	546	1	50	489
633	Physical therapist	22	703	10	123	561
635	Corrective therapist	—	508	—	—	508
636	Physical medicine and rehabilitation therapy.	41 (41)	1, 061 (1, 061)	35	55	966
637	Manual arts therapist	5	400	—	5	395
639	Educational therapist	3	161	—	5	156
644, 645	Medical technology	601 (394)	4, 323 (2, 920)	1, 028	624	2, 603
647	Medical radiology	153 (153)	1, 631 (1, 631)	332	161	1, 120

See footnotes at end of table.

Table 7. OCCUPATIONAL CLASSIFICATION OF FULL-TIME FEDERAL WHITE-COLLAR EMPLOYEES, BY SELECTED AGENCIES: OCTOBER 31, 1966—Continued

GS series [1]	Occupational series	Public Health Service, 1966	All Federal agencies, 1966 [2]	Selected agencies, 1966		
				Department of Defense	Department of Health, Education, and Welfare	Veterans' Administration
	Medical—Continued					
649	Electrocardiograph	12 (12)	293 (293)	49	14	229
650	Medical technical	124 (124)	127 (127)	2	124	—
659	Electroencephalograph	6 (6)	144 (144)	20	8	115
660, 661	Pharmacy	48 (37)	1,403 (259)	138	412	843
662, 663	Optometry	—	84 (37)	66	1	14
665, 666	Speech pathology and audiology	5 (—)	148 (34)	41	9	98
667	Orthotist and prosthetist	4	206	45	4	154
668	Podiatrist	—	24	2	1	21
669	Medical record librarian	51	226	77	54	91
670	Hospital administration	70	333	12	73	219
680	Dental officer	11	1,244	[4] 7	[5] 505	[5] 717
681	Dental assistant	243	1,758	922	249	580
682	Dental hygiene	8	272	205	12	53
683	Dental laboratory technician	32	662	241	35	381
685	Public health program specialist.	1,374	1,925	2	1,872	—
690	Industrial hygiene	7	89	50	7	—
695, 696	Food and drug	— (—)	1,033 (841)	1	1,012	—
699	Medical aid	201	1,869	335	203	1,295
(600)	Other occupations within group.	158	744	37	169	522
700–799	Veterinary medical science	15	2,339	11	175	5
800–899	Engineering and architecture:					
801, 802	General engineering	164 (117)	36,824 (25,262)	23,180	169	351
803	Safety engineering	5	437	251	5	3
810	Civil engineering	35	17,562	8,948	42	99
819	Sanitary engineering	12	1,034	99	586	5
855, 856	Electronic engineering	102 (73)	32,269 (18,334)	19,541	109	45
893	Chemical engineering	26	1,326	800	26	—
(800)	Other occupations within group.	134	45,183	25,861	143	257
900–999	Legal and kindred	29	40,911	2,067	14,032	5,474
1000–1099	Information and arts:					
1020	Illustrating	41	2,570	2,052	54	34
1021	Office drafting	14	280	176	17	2
1071	Audio-visual production	23	697	433	25	2
1081	Public information	166	2,077	850	272	20
1082	Writing and editing	88	1,828	956	161	3
1083	Technical writing and editing	45	1,673	1,316	47	3
1084	Visual information	29	833	430	52	10
1087	Editorial assistance	59	1,799	1,181	85	17
(1000)	Other occupations within group.	107	6,839	2,649	167	192
1100–1199	Business and industry	184	50,895	29,289	300	1,247
1200–1299	Copyright, patent, and trademark.	2	1,755	235	2	—

See footnotes at end of table.

Table 7. OCCUPATIONAL CLASSIFICATION OF FULL-TIME FEDERAL WHITE-COLLAR EMPLOYEES, BY SELECTED AGENCIES: OCTOBER 31, 1966—Continued

GS series [1]	Occupational series	Public Health Service, 1966	All Federal agencies, 1966 [2]	Selected agencies, 1966		
				Department of Defense	Department of Health, Education, and Welfare	Veterans' Administration
1300–1399	Physical sciences:					
1301, 1311	General physical sciences	237 (201)	9,672 (3,445)	2,774	762	76
1306	Health physics	17	232	74	17	3
1310	Physics	53	5, 531	4, 036	55	45
1320	Chemistry	834	8, 135	2, 642	1, 869	624
1382	Food technology	—	110	44	6	—
(1300)	Other occupations within group	5	17, 077	7, 315	22	2
1400–1499	Library and archives	238 (114)	7, 002	2, 722	336	376
1500–1599	Mathematics and statistics:					
1520–1530	Mathematician and statistician.	369	6, 960 (544)	3, 435	504	68
1531	Statistical, clerical, and administrative.	391	6, 778	2, 740	574	255
(1500)	Actuary, cryptography, and other.	—	186	59	22	15
1600–1699	Equipment, facilities, and service.	111	17, 907	14, 680	149	99
1700–1799	Education:					
1715	Vocational rehabilitation	4	117	—	4	103
1725	Public health educator	27	28	1	27	—
(1700)	Other occupations within group.	111	24, 379	16, 241	1, 046	19
1800–1899	Investigation:					
1860	Public health inspection	93	196	24	94	—
(1800)	Other occupations within group.	392	33, 414	621	653	94
1900–1999	Commodity quality control, inspection, and grading.	12	20, 285	15, 673	12	6
2000–2099	Supply	475	80, 379	68, 078	638	2, 800
2100–2199	Transportation	62	31, 156	10, 726	81	200
2300–2350	Postal group	—	532, 491	—	—	—

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[1] If the GS series indicates assistant or technician in the title, the number of employees is shown in parentheses ( ) after the total.

[2] Includes all employees in the United States and U.S. citizens employed abroad. Includes all branches of the Government for whom data could be obtained. Only 3 agencies are shown separately here.

[3] Does not include blue-collar workers or commissioned officers.

[4] Does not include active duty uniformed services: 12,161 physicians, 5,919 dentists, 8,182 nurses, and other personnel.

[5] Includes physicians, dentists, and nurses whom the Public Health Service and Veterans' Administration classify under other pay laws.

Sources: U.S. Civil Service Commission: *Occupations of Federal White-Collar Workers: October 31, 1966*. Pamphlet MS 56-6. Washington. U.S. Government Printing Office. June 1968.

U.S. Department of Health, Education, and Welfare, Public Health Service, Office of Personnel, Systems Management Staff.

Table 8. EMPLOYMENT IN SELECTED FEDERAL WHITE-COLLAR OCCUPATIONS: OCTOBER 31, 1964, AND 1966

GS series	Occupational series	1964	1966	GS series	Occupational series	1964	1966
602	Medical officer	11, 653	9, 689	647	Radiology technician	1, 570	1, 631
610	Nurse	22, 721	23, 465	681	Dental assistant	1, 308	1, 758
621	Nursing assistant	35, 955	37, 427	685	Public health program specialist	1, 646	1, 925
630	Dietitian	1, 161	1, 113	699	Medical aid	1, 593	1, 869
636	Physical medicine and rehabilitation therapy assistant	1, 047	1, 061	701	Veterinary medical science	2, 289	2, 339
645	Medical technician	2, 639	2, 920				

Source: U.S. Civil Service Commission: *Occupations of Federal White-Collar Workers: Oct. 31, 1966.* Pamphlet MS 56-6. Washington. U.S. Government Printing Office. June 1968. Also prior issues.

Table 9. OCCUPATION OF FULL-TIME EMPLOYEES OF STATE HEALTH DEPARTMENTS AND LOCAL HEALTH UNITS: UNITED STATES, JANUARY 1, 1964, 1965, AND 1966

Occupation	State health department employees			Local health unit employees, 1964 [1]
	1966	1965	1964	
All occupations	25, 346	22, 697	19, 009	51, 632
Physicians	737	708	609	1, 668
Public health nurses	1, 699	1, 571	869	16, 058
Clinic nurses	92	95	61	841
Dentists	166	166	164	402
Dental hygienists	64	66	58	496
Engineers	1, 065	996	830	464
Sanitarians	1, 093	1, 072	688	7, 508
Other sanitation personnel	663	544	350	2, 188
Laboratory personnel	2, 545	2, 285	2, 158	1, 546
Health educators	324	286	233	361
Nutritionists	207	187	146	177
Social workers	296	291	230	688
Psychologists	53	66	69	156
Analysts and statisticians	554	544	387	250
Veterinarians	57	62	51	209
Public health investigators	491	403	337	543
X-ray technicians	191	197	222	380
Physical therapists	122	127	82	249
Administrative management	1, 682	1, 443	1, 128	795
Clerical	9, 357	8, 776	7, 733	11, 634
Maintenance and service	3, 406	2, 101	1, 677	3, 143
Other personnel [2]	482	711	[3] 927	1, 876

[1] Latest data available.

[2] Includes some personnel in special programs such as air pollution, water pollution, radiological health, industrial hygiene, alcoholism, and community health.

[3] Includes attorneys, consultants, program representatives, and others who work with administrative management. These occupations were included in the administrative management group in 1965 and 1966.

Source: Bureau of State Services, Community Health: *Joint Form 5, Report of State Health Department Personnel by Organizational Unit, and Report of Public Health Personnel Submitted by Local Health Departments.* Public Health Service, U.S. Department of Health, Education, and Welfare. Mimeographed tables dated Aug. 9, 1966, Jan. 4, 1966, and May 17, 1965. Data for United States, Puerto Rico, Guam, and the Virgin Islands.

Table 10. PERSONNEL IN HOSPITALS: APRIL 1966

Category of personnel	Number
Total professional and technical	[1] 1, 332, 100
Nursing service:	
Nurse—R.N	361, 000
Licensed practical nurse	150, 600
Surgical technician	17, 600
Aide, orderly (except in psychiatric hospitals)	374, 400
Aide, orderly in psychiatric hospitals	117, 600
Diagnostic services:	
Medical technologist	54, 500
Laboratory assistant	14, 600
Cytotechnologist	1, 600
Histologic technician	3, 900
Electrocardiograph technician	5, 900
Therapeutic services:	
Occupational therapist	4, 100
Occupational therapy assistant	3, 800
Physical therapist	8, 500
Physical therapy assistant	5, 200
Social worker	10, 700
Social work assistant	1, 500
Recreation therapist	3, 800
Inhalation therapist	5, 600
Speech pathologist and audiologist	1, 200
Radiology:	
Radiologic technologist	24, 000
X-ray assistant	6, 000
Pharmacy:	
Pharmacist	9, 400
Pharmacy assistant	5, 600
Medical records:	
Medical record librarian	6, 300
Medical record technician	10, 100
Dietary:	
Dietitian	12, 700
Food service manager	5, 400
All other professional and technical	106, 500

[1] Estimates for 7,000 AHA registered hospitals based on 5,300 returns in PHS-AHA survey.

Source: Bureau of Health Manpower: *Health Manpower Perspective: 1967*. PHS Pub. No. 1667. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1967.

Table 11. PERSONNEL IN EXTENDED CARE FACILITIES: APRIL 1966

Category of personnel	Number
Total professional and technical	[1] 275, 000
Nursing services:	
Nurse—R.N	31, 000
Licensed practical nurse	33, 600
Aide, orderly, attendant	177, 400
Therapeutic services:	
Occupational therapist	1, 600
Occupational therapy assistant	1, 300
Physical therapist	2, 000
Therapeutic services—Continued	
Physical therapy assistant	900
Social worker	1, 200
Recreation therapist	2, 600
Speech pathologist and audiologist	300
Medical records:	
Medical record librarian	300
Medical record technician	800
Dietary: Dietitian	4, 600
All other professional and technical	17, 400

[1] Estimates for all known extended care facilities based on 490 returns in Public Health Service survey.

Source: Bureau of Health Manpower: *Health Manpower Perspective: 1967*. PHS Pub. No. 1667. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1967.

CHAPTER 1

Administration of Health Services

Administration is one of the top goals of advancement in many professions. In the health field it is customary for a physician to serve as the head of a public health department; a visiting nurse service may be administered by a registered nurse; and a laboratory, by a scientist. Among other professional persons in administrative positions are dentists, veterinarians with public health training, public health engineers and other specialists in environmental control, health statisticians, public health educators, health information specialists, social workers, and others with a solid foundation of professional skill.

In recent years an increasing number of administrators have been employed with professional training and competence in administration as a specialty in its own right. Working with the health administrator and others are health program analysts, health program representatives, and other staff members with similar position titles, all of whom help to strengthen efficiency, planning, and leadership within the health organization. An estimated 39,000 to 44,000 persons were employed in 1967 in the administrative positions listed below:

Health organization:	*Estimated numbers employed* [1]
Health department	3,000 to 4,000 public health administrators, program analysts, and program representatives.
Hospitals	14,000 to 15,000 hospital administrators and assistants.
Nursing and personal care homes.	13,000 to 15,000 nursing home administrators and assistants.
Voluntary health agencies	9,000 to 10,000 voluntary health agency administrators and program representatives.

Workers are also needed to provide the necessary business, clerical, and maintenance services. Persons that are concerned with these aspects include: Accountant, admitting officer, business manager, cashier, comptroller, credit manager, director of office services, director of volunteer services, employment interviewer, employment manager, housekeeper and housekeeping workers, job analyst, laundry manager and workers, maintenance workers, personnel director and officer of personnel, public relations director, purchasing agent, stationary engineers, and stockroom manager. No statistics on employment in these occupations are provided since most of them are not unique to the health field.

Health Department Administration

State and local health departments are the official government agencies responsible for providing leadership in making the community a healthier and safer place in which to live. The health department may administer programs concerned with general health services, specific medical care services, and/or environmental control related to health. With few exceptions, the *health officer* or *commissioner* is a physician who usually has had specialized professional training and experience in public health (see ch. 18). The health officer, as chief executive of the health department, administers the direct services for which responsibility is assigned to his department by law. He also assumes leadership in stimulating communitywide cooperation and action to strengthen gaps in health practices and services in the area.

In a large health department a *public health administrator* may serve as alter ego of the health officer on all matters pertaining to administrative management. This executive has responsibility for organizing, planning, and directing such functions as budget, personnel, procurement, legal and related administrative services, and perhaps statistics, research, and other professional programs. He has professional competence in administrative practices and procedures, particularly as they relate to public health programs. His training may have been in a school of public health. In 1966–67, 103 administrators were graduated from U.S. schools of public health with major subjects in administration in public health, medical care, or hospitals; 45 were sponsored by the U.S. Public Health Service (table 6, Introduction).

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[1] Excludes physicians, nurses, and other health personnel with specific professional skills discussed in subsequent chapters.

Another specialist who is frequently included on the staff of larger health departments is a health *program analyst.* This person is a planning specialist—a professional expert in his own right, with basic training in some field such as statistics, economics, or sociology. He may also be known as a public health analyst or specialist.

The director of each program in the health department probably has on his staff a health *program representative.* This position requires someone with a bachelor's degree although he may not be trained in a specific health profession. This public health advisor or representative takes part in promoting public participation in new health services, program planning, and fact gathering.

About 3,000 to 4,000 persons were employed in 1967 in the positions of public health administrator, health program analyst, and health program representative, in State and local health departments and in Federal health programs (tables 7 and 9, Introduction).

Membership in the Association of Management in Public Health (620 members in 1967) and the American Public Health Association provide possible identification of many of these persons.

Administration of Hospitals, Nursing Homes, and Related Institutions

As the hospital developed into a highly specialized institution, it required a skilled and trained person to manage its general activities and functions. This is the role of the *hospital administrator* who serves as the chief executive officer of the hospital. He administers and coordinates all activities of the hospital within the general policies established by a governing board. It is his responsibility to provide and maintain facilities, equipment, and assistance in order that the patient may be restored to health.

In 1967, there were approximately 14,000 to 15,000 administrators, including assistants, in some 9,000 hospitals of all types in the United States. This estimate is based on the administration of hospitals registered by the American Hospital Association (*10*) and on other hospitals included in the NCHS Master Facility Inventory (*11*). The American College of Hospital Administrators has about 8,000 members.

About two-thirds of these administrators work in nonprofit or private hospitals, and the remainder work in Federal, State, and local government hospitals. Probably 3,000 or so are physicians or nurses. The growth of professional personnel as hospital administrators and assistants is indicated by the increase in numbers employed from fewer than 9,000 in 1950 to about 12,000 in 1960, and approximately 14,000 to 15,000 in 1967.

The graduate program for professional administrators consists of 1 or 2 years of academic study, and may include a year of "administrative residence" in a hospital. At the end of this program, students are eligible to receive a master's degree in hospital administration. In 1967, 376 students completed the academic requirements for a degree in hospital administration. Twenty-four schools in the United States offer graduate courses in this field (tables 12 and 13). More new schools are expected to open within the next few years.

In 1964, 17,400 nursing care and related homes in the United States also required administrative management. An estimated 21,000 persons were employed as nursing home administrators and assistant administrators (*12*). About 9,000 of these persons had additional duties, such as nursing. The 12,000 persons without additional duties probably include some professional or practical nurses, although they reported that serving as administrator or assistant administrator was their only job in the home.

In 1967, the number of nursing care and related homes had increased to 20,500. The number of nursing home administrators and assistant administrators is now estimated to be between 13,000 and 15,000.

Administration of Voluntary Health Agencies

Voluntary health agencies are nonprofit organizations supported primarily by contributions from the public rather than from government sources or endowments. They engage in programs of research, education, and service to individuals and communities in their particular sphere of interest—generally a group of related diseases or of related services.

The *administrator* or *executive director* of the health agency is administratively responsible for coordinating the activities of paid and voluntary personnel to see that an effective program is developed. His responsibilities include working with the board of directors to set the course of the agency's activities; informing the community of the health problems and their resources for meeting them; promoting local fund raising; helping to recruit volunteer workers; and carrying out personnel functions of the staff. In the majority of voluntary health agencies, the local units are so small that the person employed as administrator or executive is generally expected also to have specialized skills in one or more of the technical aspects of the local program, e.g., physical therapy, nursing, fund raising, health education. The positions which place primary emphasis on administration and administrative skills are more frequently found at the State or national level.

The *program representative* maintains the contact through which the State, regional, or national organization and its affiliates communicate with each other and work together. He helps the State or local executive by acting as a consultant for the program in his community and works with community leaders to set up a local unit.

There are about 60 national voluntary health agencies in the United States. Most of the large agencies are members of the National Health Council. An estimated 9,000 to 10,000 persons are employed in administrative and program professional positions on national, State, and local levels.

REFERENCES

(*10*) American Hospital Association: *Hospitals*, Guide Issue, Part 2. *J.A.H.A.* 39 (15): 404, August 1967.

(*11*) National Center for Health Statistics: Development and maintenance of a national inventory of hospitals and institutions. *Vital and Health Statistics.* PHS Pub. No. 1000—Series 1—No. 3. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, February 1965.

(*12*) National Center for Health Statistics: Employees in nursing and personal care homes, United States, May–June 1964. *Vital and Health Statistics.* PHS Pub. No. 1000—Series 12—No. 5. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, September 1966.

Table 12. SCHOOLS OFFERING HOSPITAL ADMINISTRATION PROGRAMS, STUDENTS, AND GRADUATES: SELECTED YEARS, 1949–50 THROUGH 1967–68

Academic year	Schools [1]	Students	Graduates
1967–68	17	868	----------
1966–67	16	839	330
1965–66	16	770	305
1964–65	16	695	279
1963–64	16	----------	243
1962–63	16	----------	----------
1961–62	15	----------	243
1960–61	14	----------	----------
1959–60	14	----------	----------
1954–55	13	----------	200
1949–50	13	----------	126

[1] Member programs of AUPHA. See table 13 for 7 additional programs in 1968.

Source: Association of University Programs in Hospital Administration.

Table 13. LOCATION AND OWNERSHIP OF SCHOOLS OFFERING HOSPITAL ADMINISTRATION PROGRAMS AND NUMBERS OF STUDENTS AND GRADUATES: 1967

Location	School	Ownership	Students	Graduates
	Total, 24 schools		1, 150	376
Ala.	University of Alabama, Birmingham [2]	Public	12	3
Calif.	University of California, Berkeley [2]	do	24	14
	University of California, Los Angeles [2]	do	39	14
Conn.	Yale University, New Haven [2]	Private	25	10
D.C.	George Washington University, Washington [2]	do	186	56
Fla.	University of Florida, Gainesville [2]	Public	23	8
Ga.	Georgia State College, Atlanta	do	25	9
Ill.	University of Chicago, Chicago [2]	Private	31	15
Iowa	University of Iowa, Iowa City [2]	Public	38	20
Mich.	University of Michigan, Ann Arbor [2]	do	34	12
Minn.	University of Minnesota, Minneapolis [2]	do	70	36
Mo.	St. Louis University, St. Louis [2]	Private	53	20
	University of Missouri, Columbia [1]	Public	26	—
	Washington University, St. Louis [2]	Private	37	15
N.Y.	Columbia University, New York City [2]	do	33	11
	Cornell University, Ithaca [2]	do	38	13
	Wagner College, Staten Island [1]	do	46	—
N.C.	Duke University, Durham [2]	do	31	14
Ohio	Xavier University, Cincinnati	do	77	34
Pa.	University of Pittsburgh, Pittsburgh [2]	Public	30	8
Tex.	Baylor University Medical Service School, Fort Sam Houston.[2]	Private	113	47
	Trinity University, San Antonio	do	61	3
Va.	Medical College of Virginia, Richmond [2]	Public	51	14
P.R.	University of Puerto Rico, San Juan [1]	do	47	—

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[1] 1st graduating class in 1968.

[2] Member programs of AUPHA.

Source: Association of University Programs in Hospital Administration.

CHAPTER 2

Anthropology and Sociology

Four of the basic social sciences have specialists concerned with the utilization of their findings in the solution of health problems. Anthropology and sociology are considered in this chapter; economics is discussed in chapter 10, and psychology, in chapter 26.

The contributions of anthropologists and sociologists to health are primarily through research. Those in the health field are most often employed on the teaching or research staff of medical colleges and graduate departments of schools of public health and preventive medicine. A few find employment on hospital staffs in large health departments.

Anthropologists were included in the National Science Foundation's National Register of Scientific and Technical Personnel for the first time in 1966, with about 900 respondents. About 3,600 sociologists responded to the National Register in 1966. A survey of the supply of and demand for anthropologists and sociologists has been conducted by the National Institute of Mental Health of the Public Health Service. Preliminary findings should be available late in 1968.

Information on the number of degrees conferred in the fields of anthropology and sociology is given in table 14, and on the institutions that conferred these degrees, in table 15. No information is available on degrees with specialization in the health aspects of these subjects.

Anthropologist

The *anthropologist* makes comparative studies of the origin, evolution, and races of man; the cultures that he has created; and man's distribution and physical characteristics. Physical anthropologists study the significance and causes of physical differences in man and the interrelated effects of culture, heredity, and environment on the human form. Cultural or social anthropologists study cultural factors related to personality, mental illness, psychological development, and psychobiological stress. These two kinds of anthropologists may be considered as part of the health manpower resources.

According to the American Anthropological Association, there were approximately 2,700 anthropologists employed in this country in 1967. Of this total, probably fewer than 600 were *cultural anthropologists* and *physical anthropologists* employed in the health field.

Sociologist

Sociology is the discipline concerned with the structure, function, and role of social institutions and social behavior. *Sociologists* considered as part of health manpower try to identify such diverse social factors as those influencing the occurrence of disease, the behavior of patients, and the organization of the health professions.

The American Sociological Association identified 5,500 sociologists employed in the United States in 1967. Perhaps as many as 400 were *medical sociologists* concerned with health.

Table 14. EARNED DEGREES CONFERRED IN ANTHROPOLOGY AND SOCIOLOGY: 1960–61 THROUGH 1965–66

Academic year	Anthropology			Sociology		
	Bachelor's	Master's	Doctor's	Bachelor's	Master's	Doctor's
1965–66	1, 503	297	98	15, 203	981	244
1964–65	1, 203	224	88	12, 896	789	230
1963–64	964	180	85	11, 053	646	198
1962–63	746	160	86	9, 055	684	208
1961–62	577	143	82	8, 183	578	173
1960–61	481	87	49	7, 519	504	184

Source: National Center for Educational Statistics: *Summary Report on Bachelor's and Higher Degrees Conferred During the Year 1965–66*. OE 54013A–66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968. Also prior annual issues. Data for United States, Canal Zone, Puerto Rico, and the Virgin Islands.

Table 15. LOCATION OF SCHOOLS CONFERRING DEGREES IN ANTHROPOLOGY AND/OR SOCIOLOGY AND NUMBER OF GRADUATES: 1965–66

Location	School	Anthropology			Sociology		
		Bachelor's	Master's	Doctor's	Bachelor's	Master's	Doctor's
	Total, all schools	1, 503	297	98	15, 203	981	244
	Selected schools	1, 033	297	98	6, 745	981	244
Ala	University of Alabama, College	6	1	—	20	2	—
Ariz	Arizona State University, Tempe	12	1	—	76	4	—
	University of Arizona, Tucson	42	6	4	21	4	—
Ark	University of Arkansas, Fayetteville	—	—	—	3	3	—
Calif	California State College, Los Angeles	—	—	—	70	8	—
	Fresno State College, Fresno	—	—	—	25	3	—
	Sacramento State College, Sacramento	17	5	—	—	—	—
	San Diego State College, San Diego	—	—	—	50	2	—
	San Fernando Valley State College, Northridge.	—	—	—	120	1	—
	San Francisco State College, San Francisco.	—	—	—	122	6	—
	San Jose State College, San Jose	—	—	—	207	8	—
	Stanford University, Stanford	16	9	5	21	10	7
	University of California, Berkeley	142	6	3	125	57	8
	University of California, Davis	13	6	—	—	—	—
	University of California, Los Angeles	72	31	9	145	16	4
	University of California, Santa Barbara	34	3	—	131	2	1
	University of Redlands, Redlands	—	—	—	12	1	—
	University of Southern California, Los Angeles.	5	1	—	46	7	7
Colo	Colorado State University, Fort Collins	—	—	—	25	6	—
	University of Colorado, Boulder	26	18	1	51	1	4
	University of Denver, Denver	8	1	—	34	2	—
Conn	University of Connecticut, Storrs	—	—	—	52	7	3
	Yale University, New Haven	12	2	1	4	5	5
Del	University of Delaware, Newark	—	—	—	12	1	—
D.C	American University, Washington	—	—	—	18	2	1
	Catholic University of America, Washington.	—	2	5	20	25	4
	George Washington University, Washington.	21	2	—	44	3	—
	Howard University, Washington	—	—	—	58	5	—
Fla	Florida State University, Tallahassee	—	—	—	12	7	9
	University of Florida, Gainesville	3	2	—	16	3	—
Ga	Atlanta University, Atlanta	—	—	—	—	7	—
	Emory University, Atlanta	—	—	—	16	5	2
	University of Georgia, Athens	—	—	—	31	5	—
Hawaii	University of Hawaii, Honolulu	8	4	—	83	10	—
Ill	Illinois Institute of Technology, Chicago.	—	—	—	3	18	—
	Loyola University, Chicago	—	—	—	80	4	—
	Northern Illinois University, Dekalb	—	—	—	25	2	—
	Northwestern University, Evanston	—	8	4	28	15	3
	Roosevelt University, Chicago	—	—	—	55	5	—
	Southern Illinois University, Carbondale.	—	—	—	87	8	—
	University of Chicago, Chicago	13	31	11	13	32	13
	University of Illinois, Urbana	25	4	—	58	5	3

Table 15. LOCATION OF SCHOOLS CONFERRING DEGREES IN ANTHROPOLOGY AND/OR SOCIOLOGY AND NUMBER OF GRADUATES: 1965–66—Continued

Location	School	Anthropology			Sociology		
		Bachelor's	Master's	Doctor's	Bachelor's	Master's	Doctor's
Ind.	Ball State University, Muncie	—	—	—	1	5	—
	Indiana University, Bloomington	12	8	—	6	1	—
	Indiana State University, Terre Haute	—	—	—	63	9	4
	Purdue University, Lafayette	—	—	—	35	7	5
	University of Notre Dame, Notre Dame.	—	—	—	41	7	3
Iowa	Drake University, Des Moines	—	—	—	37	1	—
	Iowa State University of Science and Technology, Ames.	—	—	—	31	7	6
	University of Iowa, Iowa City	—	—	—	56	6	2
Kans.	Fort Hays Kansas State College, Hays	—	—	—	10	1	—
	Kansas State College of Pittsburg, Pittsburg.	—	—	—	4	2	—
	Kansas State University Agriculture and Applied Science, Manhattan.	—	—	—	20	4	—
	University of Kansas, Lawrence	16	4	—	32	4	1
	Wichita State University, Wichita	—	—	—	38	3	—
Ky.	University of Kentucky, Lexington	2	1	—	17	6	3
	University of Louisville, Louisville	—	—	—	22	1	—
La.	Louisiana State University and A. & M. College, Baton Rouge.	3	1	—	44	7	2
	Tulane University of Louisiana, New Orleans.	12	1	1	14	2	2
Maine	University of Maine, Orono	—	—	—	55	1	—
Md.	Johns Hopkins University, Baltimore	—	—	—	—	—	2
	University of Maryland, College Park	—	—	—	121	6	4
Mass.	Boston University, Boston	—	1	—	82	13	—
	Brandeis University, Waltham	5	5	2	34	5	2
	Clark University, Worcester	—	—	—	18	1	—
	Harvard University, Cambridge	25	8	13	159	7	7
	Northeastern University, Boston	—	—	—	28	3	—
	Tufts University, Medford	—	—	—	25	2	—
	University of Massachusetts, Amherst.	—	—	—	39	4	4
Mich.	Central Michigan University, Mount Pleasant.	—	—	—	24	2	—
	Michigan State University, East Lansing.	13	9	1	32	10	8
	University of Detroit, Detroit	—	—	—	19	12	—
	University of Michigan, Ann Arbor	33	15	9	47	21	6
	Wayne State University, Detroit	3	1	—	87	10	5
	Western Michigan University, Kalamazoo.	—	—	—	72	3	—
Minn.	College of St. Thomas, St. Paul	—	—	—	16	1	—
	University of Minnesota, Minneapolis	39	2	2	240	9	4
Miss.	Mississippi College, Clinton	—	—	—	13	2	—
	Mississippi State University, State College.	—	—	—	11	6	—
	University of Mississippi, University	7	1	—	31	3	—
	University of Southern Mississippi, Hattiesburg.	—	—	—	17	1	—
Mo.	St. Louis University, St. Louis	2	1	—	42	5	3
	University of Missouri, Columbia	4	1	—	22	2	6
	University of Missouri, Kansas City	—	—	—	26	8	—
	Washington University, St. Louis	—	4	—	43	12	—

Table 15. LOCATION OF SCHOOLS CONFERRING DEGREES IN ANTHROPOLOGY AND/OR SOCIOLOGY AND NUMBER OF GRADUATES: 1965–66—Continued

Location	School	Anthropology			Sociology		
		Bachelor's	Master's	Doctor's	Bachelor's	Master's	Doctor's
Mont.	Montana State University, Bozeman	—	—	—	6	2	—
	University of Montana, Helena	17	1	—	41	2	—
Nebr.	Municipal University of Omaha, Omaha.	—	—	—	12	4	—
	University of Nebraska, Lincoln	5	1	—	25	1	2
N.H.	University of New Hampshire, Durham.	—	—	—	13	2	—
N.J.	Princeton University, Princeton	—	—	—	6	5	2
	Rutgers, The State University, New Brunswick	—	—	—	129	11	—
N. Mex.	New Mexico State University, University Park	—	—	—	6	1	—
	University of New Mexico, Albuquerque.	27	2	—	14	1	—
N.Y.	Adelphi University, Garden City	—	—	—	21	5	—
	CUNY Brooklyn College, Brooklyn	—	—	—	164	3	—
	CUNY City College, New York	—	—	—	89	4	—
	CUNY Hunter College, New York	55	2	—	214	7	—
	CUNY Queens College, New York	—	—	—	73	1	—
	Columbia University, New York	23	20	6	41	16	8
	Cornell University, Ithaca	14	3	3	15	9	—
	Fordham University, New York	—	—	—	18	26	5
	New School for Social Research, New York.	—	—	—	9	24	2
	New York University, New York	4	1	—	70	19	7
	St. Bonaventure University, St. Bonaventure.	—	—	—	13	2	—
	St. John's University, Jamaica	—	—	—	—	5	—
	SUNY College of Agriculture at Cornell University, Ithaca.	—	—	—	12	9	2
	SUNY State University at Buffalo, Buffalo.	28	5	2	148	6	3
	Syracuse University, Syracuse	13	1	1	91	3	1
	University of Rochester, Rochester	5	1	—	—	—	—
N.C.	Duke University, Durham	—	—	—	8	8	2
	North Carolina College at Durham, Durham.	—	—	—	32	2	—
	University of North Carolina at Chapel Hill.	5	2	—	45	4	6
	University of North Carolina at Raleigh, Raleigh.	—	—	—	16	5	—
N. Dak.	University of North Dakota, Grand Forks.	—	—	—	4	4	—
Ohio	Bowling Green State University, Bowling Green.	—	—	—	28	5	—
	Kent State University, Kent	—	—	—	—	13	—
	Miami University, Oxford	—	—	—	45	1	—
	Oberlin College, Oberlin	—	—	—	30	1	—
	Ohio State University, Columbus	14	—	1	60	21	6
	University of Akron, Akron	—	—	—	11	1	—
	University of Toledo, Toledo	—	—	—	15	1	—
	Western Reserve University, Cleveland	—	—	—	17	13	—

Table 15. LOCATION OF SCHOOLS CONFERRING DEGREES IN ANTHROPOLOGY AND/OR SOCIOLOGY AND NUMBER OF GRADUATES: 1965-66—Continued

Location	School	Anthropology			Sociology		
		Bachelor's	Master's	Doctor's	Bachelor's	Master's	Doctor's
Okla	Oklahoma State University Agriculture and Applied Science, Stillwater.	—	—	—	43	2	—
	University of Oklahoma, Norman	9	3	—	23	1	—
	University of Tulsa, Tulsa	—	—	—	24	1	—
Oreg	University of Oregon, Eugene	20	4	3	103	8	4
Pa	Bryn Mawr College, Bryn Mawr	—	—	—	5	2	—
	Duquesne College, Pittsburgh	—	—	—	31	6	—
	Pennsylvania State University, University Park.	13	5	—	25	7	3
	Temple University, Philadelphia	—	—	—	41	10	—
	University of Pennsylvania, Philadelphia.	16	7	4	57	13	5
	University of Pittsburgh, Pittsburgh	8	3	—	33	8	1
R.I	Brown University, Providence	19	1	—	20	5	4
S. Dak	South Dakota State University, Brookings.	—	—	—	7	1	—
	University of South Dakota, Vermillion.	—	—	—	7	1	—
Tenn	Fisk University, Nashville	—	—	—	18	1	—
	George Peabody College for Teachers, Nashville.	—	—	—	—	1	—
	Scarritt College, Nashville	—	2	—	—	—	—
	University of Tennessee, Knoxville	—	—	—	43	1	—
	Vanderbilt University, Nashville	—	—	—	18	3	1
Tex	Baylor University, Waco	—	—	—	23	2	—
	East Texas State University, Commerce.	—	—	—	21	1	—
	North Texas State University, Denton	—	—	—	15	3	—
	St. Mary's University, San Antonio	—	3	—	—	—	—
	Sam Houston State College, Huntsville	—	—	—	52	1	—
	Southern Methodist University, Dallas	—	—	—	7	2	—
	Stephen F. Austin State College, Nacagdoches.	—	—	—	9	1	—
	Texas A. & M. University, College Station.	—	—	—	11	3	—
	Texas Christian University, Fort Worth.	—	—	—	17	4	—
	Texas Southern University, Houston	—	—	—	14	1	—
	Texas Technological College, Lubbock	—	—	—	19	6	—
	Texas Women's University, Denton	—	—	—	44	2	—
	Trinity University, San Antonio	—	—	—	13	5	—
	University of Texas, Austin	16	3	—	47	15	6
Utah	Brigham Young University, Provo	—	—	—	143	5	—
	University of Utah, Salt Lake City	7	—	2	98	3	1
	Utah State University, Logan	—	—	—	20	1	—
Wash	University of Washington, Eugene	32	7	1	119	14	4
	Washington State University, Pullman	4	6	—	40	7	3
W. Va	Marshall University, Huntington	—	—	—	6	4	—
	West Virginia University, Morgantown	—	—	—	34	3	—
Wis	Marquette University, Milwaukee	—	—	—	52	2	—
	University of Wisconsin, Madison	23	7	4	78	37	13
	University of Wisconsin, Milwaukee	5	1	—	31	2	—

Source: National Center for Educational Statistics: *Earned Degrees Conferred 1965-66*. OE-54013-66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968.

CHAPTER 3

Automatic Data Processing

A substantial part of the processing and analysis of statistical data is accomplished with the aid of electrical accounting machines (EAM) and electronic data processing equipment (EDP). Computers and other electronic business machines developed since 1950 are helping to streamline and expedite large-scale operations throughout the health field. Electronic data processing involves three main job areas—systems analysis, programing, and computer operations.

In 1965–66, 89 bachelor's, 238 master's, and 19 doctor's degrees were awarded in the field of computer science and systems analysis (table 3, Introduction).

The *health systems analyst* defines the broad outlines of the machine solution of the problem. He must have a detailed understanding of the application to the health field and know the overall capacities of the equipment. Knowledge of electronic data processing may have been obtained through formal courses or on-the-job training or through college instruction leading to a degree in business administration, statistics, engineering, or a related science.

The *programer* prepares problem solving procedures, flow charts, and computer instructions for which he does not need specialized competency in the health field. These instructions, along with problem data, are translated into computer language and fed to the computer via punchcard, tape, page readers, or other means of input. Computer programing ordinarily calls for a college degree with courses in mathematics, physics, or engineering. A number of colleges are developing graduate and undergraduate courses in computer programing and technology.

The *computer operator* has the task of operating the console and reading the documentation provided, so that the machine creates the output information from the designated inputs. Educational requirements vary from on-the-job training to courses in a technical school or college. Similar education is required for the operation of conventional punchcard equipment, including sorters, collators, and tabulators. However, no special training is required for working in a health setting.

Information on the numbers of persons who are employed in the health field as programers, and operators of EAM and EDP equipment is not available, nor are estimates available for *electronic technicians* and related personnel. The Data Processing Management Association has an estimated 25,000 members, many of whom are employed in the health field. The Association estimated that 500 persons were employed in 1967 as systems analysts in the health field.

CHAPTER 4

Basic Sciences in the Health Field

Science is basic to all activities in the health field. Scientists with an academic background in one of the basic scientific disciplines or in the application of mathematics to these disciplines engage in research to provide new knowledge and deeper insights in every health profession. The biological sciences provide the basic supply for medical research. However. modern medical research is also drawing heavily upon scientists trained in an increasing diversity of fields of study within the sciences—mathematical, natural, and social.

Revised estimates for 1965 indicate that more than 64,000 professional workers were engaged in medical and health-related research. This represents more than a threefold increase in numbers since 1954, the first year for which estimates are available (table 16).

The 1965 figure for research scientists includes 17,000 professional doctors of medicine, dentistry, and veterinary medicine; 32,000 research doctors, Ph. D.'s, Sc. D.'s, etc.; and 15,000 persons with master's or bachelor's degrees. Preliminary estimates for 1967 show that 52,000 persons (Ph. D., Sc. D., M.S., B.A., etc.) were engaged in research. (This excludes approximately 19,000 doctors of medicine, dentistry and veterinary medicine.) These professional workers function as the principal investigators and collaborators in medical and health-related research. Persons with such training who work as research assistants, technicians, and other supporting personnel are not included.

Nearly two-thirds of the total number are engaged in medical research in universities and research institutes. The remainder are almost equally divided between industry and government. Research is often combined with teaching and/or service for the M.D.'s and Ph. D.'s in medical schools, universities, teaching hospitals, and similar multipurpose institutions.

More than 700 colleges and universities enrolled about 63,700 graduate students in the biological and physical sciences in 1965–66 (table 17). About three-fourths of these students were enrolled in approximately 100 of the schools.

Total graduate enrollment in those science fields undergirding medical and health-related research increased about 37 percent—from 46,400 in the fall of 1962 to 63,700 in 1965. The basic medical sciences increased 45 percent (from 7,100 to 10,300); other biosciences increased 59 percent (from 10,600 to 16,900); and the physical sciences increased 28 percent (from 28,600 to 36,500).

During 1965–66, degrees conferred in the biological and physical sciences included 5,200 doctor's; 9,200 master's, and 40,700 bachelor's (table 18). At the doctoral level there were 1,270 degrees in the basic medical sciences, 919 in other biosciences, and 3,028 in the physical sciences. Since 1961–62, doctorates awarded in the basic medical sciences increased 65 percent, as compared with 51 and 43 percent for the other two categories, respectively. Schools that conferred doctor's degrees in 1965–66 are identified in tables 19, 20, and 21.

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Table 16. ESTIMATED SCIENTIFIC AND PROFESSIONAL MANPOWER ENGAGED IN MEDICAL AND HEALTH-RELATED RESEARCH, BY TYPE OF EMPLOYER AND BY LEVEL OF TRAINING: SELECTED YEARS, 1954 THROUGH 1965[1]

Employer and training	1954	1958	1960	1965
Total manpower	19, 200	34, 600	[2] 41, 700	[2] 64, 000
Type of employer				
Federal Government	3, 700	6, 900	7, 800	11, 800
Industry	3, 400	6, 500	9, 200	11, 900
Universities and research institutes	12, 100	21, 200	24, 700	40, 300
Level of training				
Ph. D., Sc. D	----------	14, 700	20, 000	32, 000
M.D., D.D.S., D.V.M	----------	9, 990	11, 400	17, 000
Below doctoral[3]	----------	9, 910	10, 300	15, 000

[1] Estimates for later years unavailable.

[2] Revised estimates.

[3] M.S., M.P.H., M.A., B.S., A.B.

Source: Office of Program Planning, National Institutes of Health: Manpower for medical research requirements and resources, 1965–1970. *Resources for Medical Research, Report No. 3.* PHS Pub. No. 1001. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1964. Data for 1960 revised. Updated to 1965.

Table 17. GRADUATE ENROLLMENT IN BIOLOGICAL AND PHYSICAL SCIENCES, FALL SEMESTER 1962, 1964, AND 1965

Field of study	1962		1964		1965	
	Total	Full-time	Total	Full-time	Total	Full-time
Total	46, 359	29, 386	57, 721	36, 941	63, 671	42, 138
Basic medical sciences	7, 125	5, 195	9, 215	6, 798	10, 262	7, 882
Anatomy[1]	727	514	970	730	1, 059	831
Biochemistry	2, 006	1, 543	2, 639	1, 980	2, 933	2, 269
Biophysics	352	294	511	412	555	480
Microbiology[2]	2, 155	1, 455	2, 637	1, 821	2, 935	2, 159
Pathology[3]	286	194	323	216	384	276
Pharmacology	538	418	680	536	832	633
Physiology[4]	1, 061	777	1, 455	1, 103	1, 564	1, 234
Other biosciences	10, 643	6, 525	14, 445	8, 920	16, 903	10, 642
Biology, general	3, 658	1, 585	5, 336	2, 397	6, 389	3, 037
Botany, general	1, 398	957	1, 609	1, 086	1, 795	1, 247
Ecology	96	63	127	111	148	138
Entomology	885	602	991	693	1, 172	843
Genetics	570	443	735	561	727	588
Nutrition	186	160	333	259	400	316
Plant pathology	538	383	601	427	649	458
Plant physiology	219	168	267	223	275	225
Zoology, general	2, 437	1, 641	3, 254	2, 187	3, 504	2, 432
Biosciences, all other	656	523	1, 192	976	1, 844	1, 358
Physical sciences	28, 591	17, 666	34, 061	21, 223	36, 506	23, 614
Chemistry	12, 309	7, 659	14, 529	9, 114	15, 887	10, 181
Physics	11, 005	6, 437	13, 016	7, 769	13, 681	8, 810
Physical sciences, all other	5, 277	3, 570	6, 516	4, 340	6, 938	4, 623

[1] Includes histology, cytology, and embryology.

[2] Includes bacteriology, virology, mycology, and parasitology.

[3] Excludes plant pathology.

[4] Excludes plant physiology.

Source: National Center for Educational Statistics: *Summary Report, Students Enrolled for Master's and Higher Degrees, Fall 1965.* OE-54009-65. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office. March 1967. Also previous annual issues. Data for United States and Puerto Rico.

Table 18. EARNED DEGREES CONFERRED IN BIOLOGICAL AND PHYSICAL SCIENCES, BY LEVEL OF DEGREE AND NUMBERS OF GRADUATES: 1961-62 THROUGH 1965-66

Field of study	Bachelor's [1]			Master's			Doctor's		
	1961-62	1963-64	1965-66	1961-62	1963-64	1965-66	1961-62	1963-64	1965-66
Total	29, 836	36, 657	40, 663	6, 555	7, 860	9, 216	3, 460	4, 080	5, 217
Basic medical sciences	893	1, 143	1, 462	800	953	1, 049	574	743	1, 270
Anatomy [2]	70	45	65	90	122	96	44	51	132
Biochemistry	141	190	264	178	207	231	183	264	446
Biophysics	19	14	13	16	27	25	25	30	83
Microbiology [3]	570	763	996	323	350	385	181	183	286
Pathology [4]	6	—	—	30	52	65	11	29	37
Pharmacology	—	1	3	50	75	75	59	70	104
Physiology [5]	87	130	121	113	120	172	71	116	182
Other biosciences	13, 049	17, 987	22, 015	1, 826	2, 340	3, 175	764	882	919
Biology, general	9, 999	13, 752	16, 866	788	1, 122	1, 546	153	186	15
Botany, general	413	443	473	249	288	316	130	169	160
Ecology	—	—	3	—	—	6	2	1	34
Entomology	126	132	170	152	161	213	94	99	128
Genetics	15	17	42	39	51	65	46	65	113
Nutrition	6	23	22	19	44	116	2	14	—
Plant pathology	14	23	28	60	67	83	64	61	87
Plant physiology	3	3	—	11	17	16	21	10	73
Zoology, general	2, 404	3, 488	4, 119	455	493	660	222	217	267
Biosciences, all other	69	106	292	53	97	154	30	60	42
Physical sciences	15, 894	17, 527	17, 186	3, 929	4, 567	4, 992	2, 122	2, 455	3, 028
Chemistry	8, 086	9, 720	9, 735	1, 404	1, 566	1, 822	1, 114	1, 271	1, 580
Physics	4, 812	4, 956	4, 609	1, 425	1, 848	1, 949	667	778	1, 049
Physical sciences, all other	2, 996	2, 851	2, 842	1, 100	1, 153	1, 221	341	406	399

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[1] Includes first-professional degrees requiring 5 or more years of study—less than 0.025 percent of the total.

[2] Includes histology, cytology, and embryology.

[3] Includes bacteriology, virology, mycology, and parasitology.

[4] Excludes plant pathology.

[5] Excludes plant physiology.

Sources: National Center for Educational Statistics: *Summary Report on Bachelor's and Higher Degrees Conferred During the Year 1965-66*. OE 54013A-66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968. Also prior annual issues. Data for United States, Canal Zone, Puerto Rico, and the Virgin Islands.

Prepared by Resources Analysis Branch, Office of Program Planning and Evaluation, National Institutes of Health, based upon special tabulations provided by the National Academy of Science—National Research Council, summarized in *Doctorate Recipients from United States Universities, 1958-1966*, NAS Pub. No. 1489. Washington, 1967. Data for doctorate degrees conferred in 1965-66.

Table 19. LOCATION OF SCHOOLS CONFERRING DOCTOR'S DEGREES IN THE BASIC MEDICAL SCIENCES AND NUMBERS OF GRADUATES: 1965–66

Location	School	Total basic medical sciences	Anatomy [1]	Biochemistry	Biophysics	Microbiology [2]	Pathology	Pharmacology	Physiology
	Total, all schools	[3] 1,270	132	[3] 446	83	286	37	104	182
Ala.	University of Alabama, University	3	2	1	—	—	—	—	—
	Auburn University, Auburn	3	—	3	—	—	—	—	—
Alaska	University of Alaska, College	1	—	—	—	—	—	—	1
Ariz.	University of Arizona, Tucson	8	—	4	—	3	—	—	1
Ark.	University of Arkansas, Fayetteville	2	1	—	—	1	—	—	—
Calif.	California Institute of Technology, Pasadena	14	1	9	2	2	—	—	—
	Stanford University, Stanford	13	1	4	—	2	—	—	6
	University of California, Berkeley	37	—	16	15	5	—	—	1
	University of California, Davis	23	1	8	1	7	2	1	3
	University of California, La Jolla	2	—	2	—	—	—	—	—
	University of California, Los Angeles	22	4	6	2	5	—	2	3
	University of California, Riverside	2	—	1	—	—	—	—	1
	University of California, Santa Barbara	2	—	1	—	—	—	—	1
	University of California, San Francisco	14	1	5	—	—	—	4	4
	University of Southern California, University Park	5	1	2	—	—	—	1	1
Colo.	Colorado State University, Fort Collins	14	—	2	3	4	3	—	2
	University of Colorado, Boulder	6	1	3	—	1	—	—	1
Conn.	University of Connecticut, Storrs	11	2	4	—	2	2	—	1
	Yale University, New Haven	21	1	7	6	—	—	5	2
Del.	University of Delaware, Newark	1	—	1	—	—	—	—	—
D.C.	Catholic University of America, Washin[illegible]	6	—	1	—	4	—	—	1
	George Washington University, Washington	8	1	3	—	3	—	1	—
	Georgetown University, Washington	10	2	3	—	2	—	2	1
	Howard University, Washington	5	1	2	—	1	—	1	—
Fla.	Florida State University, Tallahassee	2	—	1	—	1	—	—	—
	University of Florida, Gainesville	9	2	3	—	4	—	—	—
	University of Miami, Coral Gables	2	—	—	—	1	—	—	1
Ga.	Emory University, Atlanta	9	3	2	—	2	—	1	1
	University of Georgia, Athens	10	—	3	—	7	—	—	—
Hawaii	University of Hawaii, Honolulu	3	—	2	—	1	—	—	—
Ill.	Illinois Institute of Technology, Chicago	1	—	1	—	—	—	—	—
	Loyola University, Chicago	5	—	3	—	—	—	1	1
	Northwestern University, Evanston	17	3	4	—	4	1	2	3
	Southern Illinois University, Carbondale	2	—	—	—	2	—	—	—
	University of Chicago, Chicago	21	2	3	6	5	1	4	—
	University of Illinois, Urbana	44	3	16	1	10	1	5	8
Ind.	Indiana University, Bloomington	28	1	9	—	12	—	2	4
	Notre Dame University, Notre Dame	3	1	—	—	1	—	—	1
	Purdue University, Lafayette	30	—	6	1	9	1	5	8
Iowa	Iowa State University of Science and Technology, Ames.	11	—	5	—	4	—	—	2
	University of Iowa, Iowa City	10	1	2	—	3	—	3	1
Kans.	Kansas State University Agricultural and Applied Science, Manhattan.	5	—	—	—	1	2	—	2
	University of Kansas, Lawrence	12	1	3	—	4	—	4	—
Ky.	University of Kentucky, Lexington	4	—	1	—	2	—	—	1
	University of Louisville, Louisville	6	—	4	—	—	—	—	2
La.	Louisiana State University, Baton Rouge	6	—	2	—	4	—	—	—
	Tulane University of Louisiana, New Orleans	11	1	4	—	3	—	2	1

See footnotes at end of table.

Table 19. LOCATION OF SCHOOLS CONFERRING DOCTOR'S DEGREES IN THE BASIC MEDICAL SCIENCES AND NUMBERS OF GRADUATES: 1965–66—Continued

Location	School	Total basic medical sciences	Anatomy[1]	Biochemistry	Biophysics	Microbiology[2]	Pathology	Pharmacology	Physiology
Maine	University of Maine, Orono	1	—	1	—	—	—	—	—
Md.	Johns Hopkins University, Baltimore	26	9	12	1	3	—	—	1
	University of Maryland, College Park	23	1	6	2	11	—	1	2
Mass.	Boston University, Boston	11	1	5	—	1	—	—	4
	Brandeis University, Waltham	7	1	4	1	1	—	—	—
	Clark University, Worcester	1	—	—	—	—	—	—	1
	Harvard University, Cambridge	32	1	18	5	2	—	2	4
	Massachusetts College of Pharmacy, Boston	2	—	1	—	—	—	1	—
	Massachusetts Institute of Technology, Cambridge	11	1	6	1	1	—	—	2
	University of Massachusetts, Amherst	1	—	—	—	—	—	—	1
	Tufts University, Medford	4	—	4	—	—	—	—	—
Mich.	Michigan State University, East Lansing	23	2	6	1	8	2	—	4
	University of Michigan, Ann Arbor	18	1	3	2	4	—	6	2
	Wayne State University, Detroit	12	2	8	—	1	—	—	1
Minn.	University of Minnesota, Minneapolis	34	3	14	1	7	2	5	2
Miss.	University of Mississippi, University	1	1	—	—	—	—	—	—
Mo.	St. Louis University, St. Louis	11	—	4	—	1	—	1	5
	University of Missouri, Columbia	14	—	5	—	3	—	1	5
	Washington University, St. Louis	7	1	2	2	—	1	1	—
Mont.	Montana State University, Missoula	2	—	1	—	1	—	—	—
Nebr.	University of Nebraska, Lincoln	8	3	2	—	1	—	1	1
N.H.	University of New Hampshire, Durham	1	1	—	—	—	—	—	—
N.J.	N.J. Col. of Medicine and Dentistry, Jersey City	1	—	—	—	—	—	—	1
	Princeton University, Princeton	7	1	4	—	—	—	—	2
	Rutgers, The State University, New Brunswick	22	1	3	—	15	—	—	3
N.Y.	Columbia University, New York	15	6	5	2	—	—	2	—
	Cornell University, Ithaca	23	1	10	2	5	1	—	4
	Fordham University, New York	2	—	—	—	—	—	—	2
	New York University, New York	21	9	5	—	4	—	—	3
	Rockefeller University, New York	12	3	7	1	—	—	1	—
	St. Bonaventure University, St. Bonaventure	1	—	—	—	1	—	—	—
	St. John's University, Jamaica	5	—	—	1	3	—	—	1
	SUNY Downstate Medical Center, Brooklyn	6	—	1	—	—	—	2	3
	SUNY State University at Buffalo, Buffalo	13	1	2	6	2	—	1	1
	SUNY Upstate Medical Center, Syracuse	2	1	1	—	—	—	—	—
	Syracuse University, Syracuse	6	—	2	—	4	—	—	—
	University of Rochester, Rochester	12	1	3	3	2	1	—	2
N.C.	Duke University, Durham	10	1	2	—	4	—	1	2
	University of North Carolina at Chapel Hill, Chapel Hill.	12	—	7	—	5	—	—	—
	University of North Carolina at Raleigh, Raleigh	2	—	2	—	—	—	—	—
	Wake Forest College, Winston-Salem	2	—	—	—	1	—	1	—
N. Dak.	North Dakota State University, Fargo	4	—	3	—	—	1	—	—
	University of North Dakota, Grand Forks	4	2	1	—	—	—	—	1
Ohio	Kent State University, Kent	1	1	—	—	—	—	—	—
	Ohio State University, Columbus	22	8	9	—	1	3	—	1
	University of Cincinnati, Cincinnati	6	2	3	—	1	—	—	—
	Western Reserve University, Cleveland	15	2	2	1	5	—	1	4
Okla.	Oklahoma State University, Stillwater	5	—	3	—	—	1	—	1
	University of Oklahoma, Norman	14	1	3	1	2	1	—	6
Oreg.	Oregon State University, Corvallis	15	1	4	—	7	—	3	—
	University of Oregon, Eugene	12	1	9	—	—	—	—	2

See footnotes at end of table.

Table 19. LOCATION OF SCHOOLS CONFERRING DOCTOR'S DEGREES IN THE BASIC MEDICAL SCIENCES AND NUMBERS OF GRADUATES: 1965–66—Continued

Location	School	Total basic medical sciences	Anatomy [1]	Biochemistry	Biophysics	Microbiology [2]	Pathology	Pharmacology	Physiology
Pa	Bryn Mawr College, Bryn Mawr	2	1	—	—	—	—	—	1
	Dusquesne College, Pittsburgh	2	—	2	—	—	—	—	—
	Hahnemann Medical College and Hospital, Philadelphia	2	—	—	—	1	—	1	—
	Jefferson Medical College, Philadelphia	4	1	1	—	—	1	—	1
	Lehigh University, Bethlehem	2	—	—	—	1	—	—	1
	Pennsylvania State University, University Park	17	—	7	6	4	—	—	—
	Philadelphia College of Pharmacy and Science, Philadelphia	2	—	—	—	—	—	2	—
	Temple University, Philadelphia	3	1	—	—	1	—	1	—
	University of Pennsylvania, Philadelphia	10	1	3	1	2	1	2	—
	University of Pittsburgh, Pittsburgh	22	2	6	2	7	—	4	1
R.I	Brown University, Providence	8	3	2	—	3	—	—	—
	University of Rhode Island, Kingston	3	—	2	—	—	—	1	—
S.C	Medical College of South Carolina, Charleston	1	—	—	—	—	—	1	—
S. Dak	University of South Dakota, Vermillion	2	—	—	—	—	—	—	2
Tenn	University of Tennessee, Knoxville	13	1	3	—	—	1	2	6
	Vanderbilt University, Nashville	9	—	2	1	1	—	2	3
Tex	Baylor University, Waco	10	—	1	—	4	—	1	4
	Rice University, Houston	1	—	1	—	—	—	—	—
	Texas A. & M. University, College Station	16	—	11	—	—	2	—	3
	Texas Technological College, Lubbock	2	—	2	—	—	—	—	—
	Texas Woman's College, Denton	1	—	1	—	—	—	—	—
	University of Houston, Houston	1	—	1	—	—	—	—	—
	University of Texas, Austin	22	4	2	—	11	—	—	5
Utah	Brigham Young University, Provo	1	—	1	—	—	—	—	—
	University of Utah, Salt Lake City	3	—	—	1	2	—	—	—
	Utah State University, Logan	4	1	1	—	1	—	—	1
Vt	University of Vermont and State Agricultural College, Burlington	3	—	2	—	—	—	1	—
Va	Medical College of Virginia, Richmond	2	1	—	—	—	—	1	—
	Virginia Polytechnic Institute, Blacksburg	4	—	4	—	—	—	—	—
	University of Virginia, Charlottesville	3	—	—	1	—	—	1	1
Wash	University of Washington, Seattle	25	3	9	1	6	1	2	3
	Washington State University, Pullman	7	—	1	—	2	2	—	2
W. Va	West Virginia University, Morgantown	13	1	5	—	3	—	2	2
Wis	Marquette University, Milwaukee	4	1	—	—	—	—	2	1
	University of Wisconsin, Madison	39	2	20	—	8	3	1	5

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[1] Includes histology, cytology, and embryology.

[2] Includes bacteriology, virology, mycology, and parasitology.

[3] Includes 1 student not allocated by school.

Source: Prepared by Resources Analysis Branch ,Office of Program Planning and Evaluation, National Institutes of Health, based upon special tabulations provided by the National Academy of Science-National Research Council, summarized in *Doctorate Recipients from United States Universities, 1958–1966*, NAS Pub. No. 1489. Washington, 1967.

Table 20. LOCATION OF SCHOOLS CONFERRING DOCTOR'S DEGREES IN BIOSCIENCES (OTHER THAN BASIC MEDICAL) AND NUMBERS OF GRADUATES: 1965–66

Location	School	Total biosciences	Biology	Botany	Entomology	Genetics	Plant pathology	Zoology	All others [1]
	Total, all schools	919	15	160	128	113	87	267	149
Ala.	Auburn University, Auburn	9	—	3	2	—	1	2	1
	University of Alabama, University	1	—	—	—	—	—	—	1
Ariz.	Arizona State University, Tempe	2	—	1	—	—	—	1	—
	University of Arizona, Tucson	7	—	—	—	—	1	5	1
Calif.	California Institute of Technology, Pasadena	1	—	—	—	—	—	—	1
	Claremont Graduate School, Claremont	2	—	2	—	—	—	—	—
	Stanford University, Stanford	8	—	—	—	1	—	5	2
	University of California, Berkeley	43	—	7	8	6	2	10	10
	University of California, Davis	54	—	7	5	13	12	3	14
	University of Califronia, La Jolla	2	—	—	—	—	—	—	2
	University of Califronia, Los Angeles	20	—	5	—	2	—	11	2
	University of California, Riverside	8	—	1	3	—	1	1	2
	University of Southern California, University Park	4	1	—	1	—	—	1	1
Colo.	Colorado State University, Fort Collins	4	—	—	—	—	1	1	2
	University of Colorado, Boulder	5	—	2	—	—	—	3	—
Conn.	University of Connecticut, Storrs	3	—	—	1	—	—	2	—
	Yale University, New Haven	11	—	2	1	5	—	—	3
Del.	University of Delaware, Newark	3	2	—	—	—	—	1	—
D.C.	Catholic University of America, Washington	4	—	2	2	—	—	—	—
	Howard University, Washington	1	—	—	—	—	—	1	—
Fla.	Florida State University, Tallahassee	2	—	1	—	—	—	1	—
	University of Florida, Gainsville	9	—	2	4	—	1	2	—
	University of Miami, Coral Gables	6	—	—	—	—	—	4	2
Ga.	Emory University, Atlanta	2	1	—	—	—	—	—	1
	University of Georgia, Athens	9	—	5	—	—	—	3	1
Hawaii	University of Hawaii, Honolulu	9	—	—	3	2	—	4	—
Ill.	Southern Illinois University, Carbondale	4	—	1	—	—	—	2	1
	University of Chicago, Chicago	15	—	4	—	2	—	3	6
	University of Illinois, Urbana	28	—	2	8	2	5	6	5
Ind.	Indiana University, Bloomington	15	—	4	—	2	—	4	5
	Purdue University, Lafayette	24	1	2	5	5	3	1	7
	University of Notre Dame, Notre Dame	2	—	—	—	2	—	—	—
Iowa	Iowa State University, Ames	23		5	3	2	3	4	6
	University of Iowa, Iowa City	6	—	3	—	—	—	1	2
Kans.	Kansas State University Agriculture and Applied Science, Manhattan.	6	—	—	6	—	—	—	—
	University of Kansas, Lawrence	17	—	5	3	1	—	8	—
Ky.	University of Kentucky, Lexington	4	—	—	—	—	2	1	1
	University of Louisville, Louisville	3	—	2	—	—	—	1	—
La.	Louisville State University and A. & M. College, Baton Rouge.	7	—	2	1	—	1	3	—
	Tulane University of Louisiana, New Orleans	6	—	—	—	—	—	6	—
Md.	Johns Hopkins University, Baltimore	5	1	—	—	2	—	—	2
	University of Maryland, College Park	5	—	—	—	1	2	2	—
Mass.	Brandeis University, Waltham	1	—	—	—	—	—	—	1
	Harvard University, Cambridge	10	—	3	1	2	—	2	2
	University of Massachusetts, Amherst	8	—	1	1	1	—	5	—
Mich.	Michigan State University, East Lansing	17	—	6	2	2	3	3	1
	University of Michigan, Ann Arbor	17	—	5	—	3	—	8	1
	Wayne State University, Detroit	1	—	—	—	—	—	1	—

See footnotes at end of table.

Table 20. LOCATION OF SCHOOLS CONFERRING DOCTOR'S DEGREES IN BIOSCIENCES (OTHER THAN BASIC MEDICAL) AND NUMBERS OF GRADUATES: 1965–66—Continued

Location	School	Total biosciences	Biology	Botany	Entomology	Genetics	Plant pathology	Zoology	All others[1]
Minn.	University of Minnesota, Minneapolis	24	—	—	3	6	8	4	3
Miss.	Mississippi State University, State College	7	—	—	6	—	—	1	—
Mo.	St. Louis University, St. Louis	1	—	—	—	—	—	1	—
	University of Missouri, Columbia	12	—	2	1	—	2	6	1
	Washington University, St. Louis	6	—	1	—	1	—	4	—
Mont.	Montana State University, Missoula	5	—	1	—	1	—	1	2
	University of Montana, Helena	1	—	—	—	—	—	1	—
Nebr.	University of Nebraska, Lincoln	9	—	2	2	1	—	4	—
N.H.	Dartmouth College, Hanover	1	—	—	—	—	—	—	1
	University of New Hampshire, Durham	12	—	—	—	—	2	10	—
N.J.	Princeton University, Princeton	2	—	—	—	—	—	1	1
	Rutgers, The State University, New Brunswick	15	—	3	1	1	2	6	2
N. Mex.	University of New Mexico, Albuquerque	1	—	1	—	—	—	—	—
N.Y.	Columbia University, New York	7	—	3	—	—	—	4	—
	Cornell University, Ithaca	36	—	7	10	5	3	5	6
	Fordham University, Bronx	1	—	—	—	—	—	1	—
	New York University, New York	3	1	—	—	—	—	2	—
	Rockefeller University, New York	2	—	—	—	1	—	—	1
	St. John's University, Jamaica	7	6	—	—	—	—	1	—
	SUNY College of Forestry, Syracuse	3	—	—	1	—	—	2	—
	SUNY State University at Buffalo, Buffalo	3	—	—	—	1	—	1	1
	SUNY Upstate Medical Center, Syracuse	1	—	—	—	—	—	—	1
	University of Rochester, Rochester	10	—	—	—	4	—	1	5
	Yeshiva University, New York	6	—	—	—	—	—	—	6
N.C.	Duke University, Durham	11	—	5	—	—	—	3	3
	University of North Carolina at Chapel Hill, Chapel Hill	1	—	—	—	—	—	1	—
	University of North Carolina at Raleigh, Raleigh	23	—	3	—	7	6	2	5
N. Dak.	North Dakota State University, Fargo	1	—	—	—	—	1	—	—
Ohio	Ohio State University, Columbus	13	—	3	1	—	3	5	1
	University of Cincinnati, Cincinnati	2	—	1	—	—	—	1	—
	Western Reserve University, Cleveland	7	—	1	1	3	—	1	1
Okla.	Oklahoma State University, Stillwater	16	—	1	5	1	—	8	1
	University of Oklahoma, Norman	11	—	2	—	—	—	8	1
Oreg.	Oregon State University, Corvallis	21	—	3	5	2	2	6	3
	University of Oregon, Eugene	3	—	—	—	1	—	1	1
Pa.	Pennsylvania State University, University Park	11	—	2	—	5	1	3	—
	University of Pennsylvania, Philadelphia	5	—	—	—	1	—	4	—
	University of Pittsburgh, Pittsburgh	4	—	—	—	1	—	2	1
R.I.	Brown University, Providence	5	1	1	—	1	—	2	—
	University of Rhode Island, Kingston	1	1	—	—	—	—	—	—
S.C.	Clemson University, Clemson	6	—	—	4	—	2	—	—
	University of South Carolina, Columbia	1	—	1	—	—	—	—	—
S. Dak.	University of South Dakota, Vermillion	1	—	—	—	—	—	1	—
Tenn.	University of Tennessee, Knoxville	4	—	2	1	—	—	1	—
	Vanderbilt University, Nashville	1	—	—	—	—	—	1	—
Tex.	Texas A. & M. University, College Station	16	—	—	5	3	2	2	4
	University of Texas, Austin	32	—	15	—	2	—	12	3
Utah	University of Utah, Salt Lake City	11	—	—	6	2	—	2	1
	Utah State University, Logan	2	—	—	—	—	—	1	1
Vt.	University of Vermont and State Agricultural College, Burlington.	1	—	—	—	—	—	1	—

See footnotes at end of table.

Table 20. LOCATION OF SCHOOLS CONFERRING DOCTOR'S DEGREES IN BIOSCIENCES (OTHER THAN BASIC MEDICAL) AND NUMBERS OF GRADUATES: 1965–66—Continued

Location	School	Total biosciences	Biology	Botany	Entomology	Genetics	Plant pathology	Zoology	All others [1]
Va.	University of Virginia, Charlottesville	1	—	1	—	—	—	—	—
	Virginia Polytechnic Institute, Blacksburg	8	—	4	2	—	—	1	1
Wash.	University of Washington, Seattle	5	—	—	—	—	—	3	2
	Washington State University, Pullman	14	—	5	3	2	—	3	1
W. Va.	West Virginia University, Morgantown	4	—	1	—	1	2	—	—
Wis.	Marquette University, Milwaukee	1	—	—	—	—	—	—	1
	University of Wisconsin, Madison	48	—	4	11	4	13	14	2

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[1] Includes ecology, nutrition, plant physiology, and all others.

Source: Prepared by Resources Analysis Branch, Office of Program Planning and Evaluation, National Institutes of Health, based upon special tabulations provided by the National Academy of Science-National Research Council, summarized in *Doctorate Recipients from United States Universities, 1958–1966*, NAS Pub. No. 1489. Washington, 1967.

Table 21. LOCATION OF SCHOOLS CONFERRING DOCTOR'S DEGREES IN PHYSICAL SCIENCES AND NUMBERS OF GRADUATES: 1965–66

Location	School	Total physical sciences	Chemistry	Physics	All others [1]
	Total, all schools	3, 028	1, 580	1, 049	399
Ala	Auburn University, Auburn	6	6	—	—
	University of Alabama, University	4	2	2	—
Alaska	University of Alaska, College	2	—	1	1
Ariz	Arizona State University, Tempe	7	4	3	—
	University of Arizona, Tucson	25	5	5	15
Ark	University of Arkansas, Fayetteville	9	9	—	—
Calif	California Inst of Technology, Pasadena	35	9	20	6
	Stanford University, Stanford	47	15	18	14
	University of California, Berkeley	119	41	63	15
	University of California, Davis	13	12	1	—
	University of California, Los Angeles	47	18	17	12
	University of California, Riverside	18	7	11	—
	University of California, La Jolla	22	—	11	11
	University of California, San Francisco	12	12	—	—
	University of California, Santa Barbara	4	2	2	—
	University of the Pacific, Stockton	4	4	—	—
	University of Southern California, University Park	9	4	2	3
Colo	Colorado School of Mines, Golden	4	—	—	4
	Colorado State University, Fort Collins	3	—	1	2
	University of Colorado, Boulder	45	19	19	7
	University of Denver, Denver	1	—	1	—
Conn	University of Connecticut, Storrs	11	7	4	—
	Yale University, New Haven	66	29	35	2
Del	University of Delaware, Newark	18	15	3	—
D.C	Catholic University of America, Washington	19	8	11	—
	George Washington University, Washington	5	4	1	—
	Georgetown University, Washington	6	4	2	—
	Howard University, Washington	4	2	2	—
Fla	Florida State University, Tallahassee	18	10	2	6
	University of Florida, Gainesville	32	20	12	—
	University of Miami, Coral Gables	6	2	—	4
Ga	Emory University, Atlanta	4	4	—	—
	Georgia Institute of Technology, Atlanta	14	8	6	—
	University of Georgia, Athens	1	1	—	—
Hawaii	University of Hawaii, Honolulu	7	7	—	—
Idaho	University of Idaho, Moscow	8	5	—	3
Ill	Illinois Institute of Technology, Chicago	20	15	5	—
	Loyola University, Chicago	4	4	—	—
	Northwestern University, Evanston	26	15	7	4
	Southern Illinois University, Carbondale	1	1	—	—
	University of Chicago, Chicago	41	18	17	6
	University of Illinois, Urbana	96	53	30	13
Ind	Indiana University, Bloomington	39	23	10	6
	Purdue University, Lafayette	63	42	20	1
	University of Notre Dame, Notre Dame	25	17	8	—
Iowa	Iowa State University of Science and Technology, Ames.	42	34	7	1
	University of Iowa, Iowa City	29	13	11	5
Kans	Kansas State University of Agriculture and Applied Science, Manhattan.	25	24	1	—
	University of Kansas, Lawrence	29	24	3	2
Ky	University of Kentucky, Lexington	6	1	5	—
	University of Louisville, Louisville	9	9	—	—

See footnotes at end of table.

Table 21. LOCATION OF SCHOOLS CONFERRING DOCTOR'S DEGREES IN PHYSICAL SCIENCES AND NUMBERS OF GRADUATES: 1965-66—Continued

Location	School	Total physical sciences	Chemistry	Physics	All others [1]
La.	La State University and A. & M. College, Baton Rouge.	25	15	4	6
	Tulane University of Louisiana, New Orleans	13	9	3	1
Maine	University of Maine, Orono	3	3	—	—
Md.	Johns Hopkins University, Baltimore	34	11	21	2
	University of Maryland, College Park	32	12	20	—
Mass.	Boston College, Chestnut Hill	6	3	3	—
	Boston University, Boston	8	4	3	1
	Brandeis University, Waltham	15	4	11	—
	Clark University, Worcester	2	2	—	—
	Harvard University, Cambridge	65	18	37	10
	Lowell Technological Institute, Lowell	2	2	—	—
	Mass Inst of Technology, Cambridge	112	51	44	17
	Northeastern University, Boston	4	2	2	—
	Tufts, University, Medford	4	3	1	—
	University of Massachusetts, Amherst	18	17	—	1
	Worcester Polytechnic Institute, Worcester	1	—	1	—
Mich.	Michigan State University, East Lansing	30	23	5	2
	University of Michigan, Ann Arbor	48	22	12	14
	Wayne State University, Detroit	12	11	1	—
Minn.	University of Minnesota, Minneapolis	44	28	8	8
Miss.	University of Mississippi, University	4	4	—	—
Mo.	St. Louis University, St. Louis	7	—	2	5
	University of Missouri, Columbia	14	7	4	3
	Washington University, St. Louis	15	4	8	3
Mont.	Montana State University, Missoula	2	2	—	—
	University of Montana, Helena	1	—	—	1
Nebr.	University of Nebraska, Lincoln	14	11	2	1
Nev.	University of Nevada, Reno	1	—	—	1
N.H.	University of New Hampshire, Durham	10	8	2	—
N.J.	Princeton University, Princeton	57	23	27	7
	Rutgers, The State Univ, New Brunswick	28	20	7	1
	Stevens Institute of Technology, Hoboken	11	6	5	—
N. Mex.	New Mexico Institute of Mining and Technology, Socorro.	1	—	—	1
	New Mexico State University, University Park	5	—	5	—
	University of New Mexico, Albuquerque	7	2	2	3
N.Y.	Adelphi University, Long Island	4	3	1	—
	Clarkson College of Technology, Potsdam	4	3	1	—
	Columbia University, New York	68	24	29	15
	Cornell University, Ithaca	50	25	23	2
	CUNY University Programs, New York	1	1	—	—
	Fordham University, Bronx	10	8	2	—
	New York University, New York	23	7	12	4
	Polytechnic Institute of Brooklyn, Brooklyn	35	27	8	—
	Rensselaer Polytechnic Institute, Troy	32	14	16	2
	Rockefeller University, New York	2	1	1	—
	St. John's University, Jamaica	1	1	—	—
	SUNY College of Forestry, Syracuse	5	5	—	—
	SUNY State University, Buffalo	18	14	4	—
	SUNY State University, Stony Brook	1	1	—	—
	Syracuse University, Syracuse	16	5	10	1
	University of Rochester, Rochester	31	9	20	2
	Yeshiva University, New York	2	—	2	—

See footnotes at end of table.

Table 21. LOCATION OF SCHOOLS CONFERRING DOCTOR'S DEGREES IN PHYSICAL SCIENCES AND NUMBERS OF GRADUATES: 1965–66—Continued

Location	School	Total physical sciences	Chemistry	Physics	All others [1]
N.C.	Duke University, Durham	23	11	12	—
	University of North Carolina at Chapel Hill	26	14	10	2
	University of North Carolina at Raleigh	3	—	3	—
N. Dak.	North Dakota State University, Fargo	3	3	—	—
	University of North Dakota, Grand Forks	4	2	—	2
Ohio	Case Institute of Technology, Cleveland	15	6	9	—
	Kent State University, Kent	1	1	—	—
	Ohio State University, Columbus	61	37	18	6
	Ohio University, Athens	12	9	3	—
	University of Akron, Akron	7	7	—	—
	University of Cincinnati, Cincinnati	21	15	3	3
	Western Reserve University, Cleveland	10	6	3	1
Okla.	Oklahoma State University, Stillwater	14	6	8	—
	University of Oklahoma, Norman	14	8	1	5
Oreg.	Oregon State University, Corvallis	31	20	4	7
	University of Oregon, Eugene	12	10	—	2
Pa.	Bryn Mawr College, Bryn Mawr	3	1	1	1
	Carnegie Institute of Technology, Pittsburgh	28	15	13	—
	Duquesne University, Pittsburgh	2	2	—	—
	Lehigh University, Bethlehem	16	7	6	3
	Pennsylvania State University, University Park	66	31	21	14
	Temple University, Philadelphia	9	5	4	—
	University of Pennsylvania, Philadelphia	42	22	20	—
	University of Pittsburgh, Pittsburgh	32	16	11	5
R.I.	Brown University, Providence	26	7	16	3
	University of Rhode Island, Kingston	9	5	—	4
S.C.	Clemson University, Clemson	8	5	2	1
	University of South Carolina, Columbia	12	8	4	—
Tenn.	University of Tennessee, Knoxville	18	10	7	1
	Vanderbilt University, Nashville	17	6	11	—
Tex.	Baylor University, Waco	4	4	—	—
	Rice University, Houston	31	11	9	11
	Texas A. & M. University, College Station	37	14	12	11
	Texas Christian University, Fort Worth	2	—	2	—
	Texas Technological College, Lubbock	2	2	—	—
	University of Houston, Houston	5	5	—	—
	University of Texas, Austin	67	30	21	16
Utah	Brigham Young University, Provo	9	6	1	2
	University of Utah, Salt Lake City	24	15	3	6
	Utah State University, Logan	2	2	—	—
Vt.	University of Vermont and State Agricultural College, Burlington.	8	8	—	—
Va.	Medical College of Virginia, Richmond	1	1	—	—
	University of Virginia, Charlottesville	16	6	10	—
	Virginia Polytechnic Institute, Blacksburg	11	4	4	3
Wash.	University of Washington, Seattle	53	27	16	10
	Washington State University, Pullman	21	12	6	3
W. Va.	West Virginia University, Morgantown	6	3	2	1
Wis.	Lawrence University, Appleton	9	8	1	—
	University of Wisconsin, Madison	95	59	24	12
Wyo.	University of Wyoming, Laramie	12	5	—	7

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[1] Includes general physical sciences, astronomy, metallurgy, meteorology, pharmaceutical chemistry, geology, geophysics, oceanography, and all other earth and physical sciences.

Source: Prepared by Resources Analysis Branch, Office of Program Planning and Evaluation, National Institutes of Health, based upon special tabulations provided by the National Academy of Science-National Research Council, summarized in *Doctorate Recipients from United States Universities, 1958–1966*, NAS Pub. No. 1489. Washington, 1967.

CHAPTER 5

Biomedical Engineering

Biomedical engineering involves the application of the principles and practices of engineering science to biomedical research and health care. A relatively new field which is aiding research, diagnosis, and therapy of many diseases and disorders—it has developed from the collaboration of physical and medical scientists. Typical activities in this field include the development of new instruments for use in patient care or in research, the invention and perfection of orthopedic and prosthetic appliances, and the adaptation of computer technology and bioengineering methods for research use in medicine and biology. This work is being conducted in hospitals, scientific foundations, government laboratories for medical research, universities, and electronic and instrumentation industries.

Biomedical engineers, who are also called *bioengineers* or *medical engineers*, work with physicians and biomedical scientists in utilizing engineering ideas and techniques to improve medical care, including diagnosis, surgery, and rehabilitation. Their interests include both health services to the individual patient and related research to gain further understanding of life science processes.

Approximately 3,000 persons were employed as biomedical engineers in 1967, according to estimates made by the Foundation for Medical Technology and the Biomedical Engineering and Instrumentation Branch of the National Institutes of Health (NIH). This estimate must be considered arbitrary due to the difficulties inherent in defining the present scope of biomedical engineering.

The minimum educational requirement for biomedical engineers is a bachelor's degree in engineering with some courses in the biophysical sciences. Within this minimum requirement there is a diversity of curriculums being offered in the name of biomedical engineering in universities throughout the country. Doctoral training programs in the field of biomedical engineering are supported by the Public Health Service in 20 institutions (table 22). A number of additional graduate and undergraduate courses are now being developed in universities for specific training in biomedical engineering.

Biomedical engineering technicians are responsible for assembling, adapting, and maintaining many new kinds of medical devices and instruments. These technicians come from many diverse fields to use their special skills in this occupation. Persons with special training in plastics, for example, work on repair and replacement materials and the development of artificial organs. (Orthotists and prosthetists who make and fit artificial limbs and braces and electronic technicians who are involved in certain aspects of computer programing and operation are discussed in other chapters of this publication.)

Information on the number of technicians currently employed is not available, but the total is estimated at about 6,000 for 1967. This estimate is based on an average of two technicians per engineer, an assumption acceptable to both the Foundation for Medical Technology and the NIH Biomedical Engineering and Instrumentation Branch.

Courses in biomedical engineering technology are being developed by some technical institutes to supplement on-the-job training of *biomedical engineering aides*.

Table 22. LOCATION AND OWNERSHIP OF SCHOOLS OFFERING DOCTORAL PROGRAMS IN BIOMEDICAL ENGINEERING: JULY 1, 1967

Location	Schools [1]	Ownership
	Total, 20 schools [2]	
Calif	California Institute of Technology, Pasadena	Private.
	University of California, Berkeley	Public.
	University of Southern California, Los Angeles	Private.
Conn	University of Connecticut, Storrs	Public.
Ill	Northwestern University, Evanston	Private.
	University of Illinois College of Engineering, Chicago	Public.
Md	Johns Hopkins University, Baltimore	Private.
Mass	Massachusetts Institute of Technology, Cambridge	Do.
Mich	University of Michigan, Ann Arbor	Public.
N.Y	Brooklyn Polytechnic Institute, Brooklyn	Private.
	New York University School of Medicine, New York	Do.
	University of Rochester, Rochester	Do.
N.C	University of North Carolina, Chapel Hill	Public.
Ohio	Case Institute of Technology, Cleveland	Private.
Pa	Carnegie Institute of Technology, Pittsburgh	Do.
	Drexel Institute of Technology, Philadelphia	Do.
	University of Pennsylvania, Philadelphia	Do.
Tex	Baylor University, Houston	Do.
Wash	University of Washington, Seattle	Public.
Wis	Marquette University, Milwaukee	Private.

[1] Only those schools which have training programs supported by U.S. Public Health Service.

[2] Data not available on number of students and graduates enrolled in these courses.

Source: U.S. Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health, National Institute of General Medical Sciences.

CHAPTER 6

Chiropractic and Naturopathy

In some States the law authorizes the licensing of "drugless healers." Chiropractors, naturopaths, and allied practitioners thus may be identified through the licenses now in effect. Probably fewer than 18,000 individuals were in practice in 1965—the latest year data are available, although how reliable this estimate is cannot be stated.

Chiropractors

Chiropractic is a system of mechanical therapeutics based on the belief that the nervous system largely determines the state of health and that any interference with this system impairs normal functions and lowers the body's resistance to disease. Chiropractors treat their patients primarily by specific adjustment of parts of the body, especially the spinal column. Chiropractic as a system of healing does not include the use of drugs or surgery.

About 19,100 *chiropractors* were licensed at the end of 1965 in the United States, according to estimates based on a survey published in the American Chiropractic Association's Journal of Chiropractic (table 23). Of the 19,100 chiropractors, licensed in 1965 in the United States, perhaps 15,000 to 17,000 were actively engaged in practice at that time. This is substantially less than had been estimated in the earlier edition of this publication. The 1950 and 1960 Censuses of Population reported 13,091 and 14,360 chiropractors, respectively, in the civilian labor force *(13)*.

The greatest number of chiropractors are in independent private practice. Some are employed by chiropractic schools or clinics, or as salaried assistants to established practitioners of chiropractic.

In 1966, chiropractors were licensed in 48 States and the District of Columbia. Most States require the successful completion of a 4-year chiropractic course leading to a Doctor of Chiropractic (D.C.). In addition, 28 States require 1 or 2 years of college as a prerequisite for entrance into a school of chiropractic, while four States require a 1-year internship. A basic science certificate based on an examination is mandatory in 24 States before chiropractors are permitted to take licensing examinations.

In 1966–67, the 12 schools recognized by two chiropractic associations are listed in table 24. They graduated 700 students with the degree of Doctor of Chiropractic (D.C.). The trend in numbers of graduates since 1961 is shown in table 25.

Naturopaths

Naturopathy is a school of healing employing a combination of nature's forces such as air, light, water, vibration, heat, electricity, dietetics, and massage. It does not include the use of drugs, surgery, and X-ray or radiation (except for diagnostic purposes). Many *naturopaths* are former chiropractors and use chiropractic treatment.

Probably fewer than 1,000 of these "healers" are currently licensed. Findings from a 1965–66 survey of State licensing of all occupations in the health field show the following licenses in effect: 100 in Arizona (53 of which are for practitioners within the State), 66 in California, 47 in Connecticut (29 of which are for practitioners within the State), 136 in Florida (apparently all for practitioners within the State), 14 in Hawaii (13 of which are for practitioners within the State), 148 in Oregon (121 of which are practitioners within the State), 42 in Utah, and 107 in Washington. The absence of a State from this list does not imply that there are no licensed naturopaths. A glance at the classified directories for some large cities across the Nation shows the presence of naturopathic physicians in at least half of the States.

A 1958 investigation (*14*) showed five institutions that taught naturopathy and/or granted degrees. By 1968, however, apparently only one of these schools was in existence, namely, National College of Naturopathic Medicine, Seattle, Wash. (See also Western States College of Chiropractic, Portland, Oreg.)

REFERENCES

(*13*) Prindle, R. A., and Pennell, M. Y.: Industry and occupation data from 1960 census, by State. *Health Manpower Source Book 17*. PHS Pub. No. 263, Section 17. Public Health Service, U.S Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1963.

(*14*) Bureau of Economic and Business Research: *Survey of Naturopathic Schools*. University of Utah, December 1958.

Table 23. LOCATION OF LICENSED CHIROPRACTORS IN RELATION TO POPULATION: DEC. 31, 1965

Location	Civilian population in thousands	Number of licensed chiropractors resident in State [1]	Chiropractors per 100,000 population
United States	193, 780	19, 131	9. 9
Alabama	3, 478	260	7. 5
Alaska	233	12	5. 2
Arizona	1, 581	180	11. 4
Arkansas	1, 946	135	6. 9
California	18, 431	4, 100	22. 2
Colorado	1, 917	167	8. 7
Connecticut	2, 866	123	4. 3
Delaware	506	21	4. 2
District of Columbia	790	[2] 25	3. 2
Florida	5, 799	616	10. 6
Georgia	4, 333	[2] 322	7. 4
Hawaii	673	17	2. 5
Idaho	693	66	9. 5
Illinois	10, 721	[2] 653	6. 1
Indiana	4, 941	277	5. 6
Iowa	2, 759	588	21. 3
Kansas	2, 240	552	24. 6
Kentucky	3, 136	482	15. 4
Louisiana	3, 574	------------	------------
Maine	962	53	5. 5
Maryland	3, 539	204	5. 8
Massachusetts	5, 365	(3)	------------
Michigan	8, 448	762	9. 0
Minnesota	3, 567	497	13. 9
Mississippi	2, 307	------------	------------
Missouri	4, 523	1, 214	26. 8
Montana	692	88	12. 7
Nebraska	1, 427	86	6. 0
Nevada	424	57	13. 4
New Hampshire	672	185	27. 5
New Jersey	6, 843	411	6. 0
New Mexico	983	90	9. 2
New York	18, 169	1, 254	6. 9
North Carolina	4, 871	258	5. 3
North Dakota	631	76	12. 0
Ohio	10, 344	[4] 852	8. 2
Oklahoma	2, 438	374	15. 3
Oregon	1, 968	255	13. 0

See footnotes at end of table.

Table 23. LOCATION OF LICENSED CHIROPRACTORS IN RELATION TO POPULATION: DEC. 31, 1965—Continued

Location	Civilian population in thousands	Number of licensed chiropractors resident in State [1]	Chiropractors per 100,000 population
Pennsylvania	11, 582	[2] 886	7. 6
Rhode Island	873	[5] 48	5. 5
South Carolina	2, 510	174	6. 9
South Dakota	673	[2] 117	17. 4
Tennessee	3, 833	[4] 183	4. 8
Texas	10, 534	1, 274	12. 1
Utah	1, 003	116	11. 6
Vermont	411	48	11. 7
Virginia	4, 300	[6] 74	1. 7
Washington	2, 983	279	9. 4
West Virginia	1, 808	30	1. 7
Wisconsin	4, 163	533	12. 8
Wyoming	315	57	18. 1

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[1] Active and inactive. The American Chiropractic Association has about 8,000 members; the International Chiropractors Association, 4,500.

[2] Data as of December 1964.

[3] Data not available since Massachusetts only licensed chiropractors since 1966.

[4] Data as of January 1965.

[5] Data as of December 1963.

[6] Estimated by Public Health Service.

Sources: Higley, H. G.: *Chiropractic Licentiates.* The ACA Journal of Chiropractic, January 1968.
National Center for Health Statistics: *State Licensing of Health Occupations.* PHS Pub. No. 1758. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968.
U.S. Bureau of the Census: Estimates of the population of States: July 1, 1966. *Current Population Reports,* Series P-25, No. 380. November 1967.

Table 24. LOCATION AND OWNERSHIP OF CHIROPRACTIC SCHOOLS AND NUMBERS OF STUDENTS AND GRADUATES: 1966–67

Location	School [1]	Students	Graduates
	Total, 12 schools	2, 576	687
	Schools approved by the American Chiropractic Association		
Calif	Los Angeles College of Chiropractic, Glendale	208	46
Ill	National College of Chiropractic, Lombard	304	75
Ind	Lincoln Chiropractic College, Indianapolis	149	35
Minn	Northwestern College of Chiropractic, Minneapolis	41	8
Mo	Logan College of Chiropractic, St. Louis	227	69
N.Y	Chiropractic Institute of New York, New York [2]	53	56
Oreg	Western States College of Chiropractic, Portland [3]	30	5
Tex	Texas Chiropractic College, Pasadena	121	13
	Schools approved by the Chiropractic Education Commission of the International Chiropractors Association		
Calif	Cleveland Chiropractic College, Los Angeles	160	50
Iowa	Palmer College of Chiropractic, Davenport	1, 019	257
Mo	Cleveland Chiropractic College, Kansas City	161	31
N.Y	Columbia Institute of Chiropractic, New York	103	42

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[1] All private schools.

[2] Closed in 1968.

[3] An affiliate but not approved.

Source: The American Chiropractic Association and the International Chiropractors Association.

Table 25. GRADUATES OF CHIROPRACTIC SCHOOLS: 1961 THROUGH 1967

Location	School	1961	1962	1963	1964	1965	1966	1967
	Total, 12 schools	665	646	597	564	627	651	687
	Schools approved by the American Chiropractic Association, total.[1]	329	314	302	256	241	245	307
Calif.	Los Angeles College of Chiropractic, Glendale	52	55	49	39	41	43	46
Ill.	National College of Chiropractic, Lombard	62	55	51	43	39	41	75
Ind.	Lincoln Chiropractic College, Indianapolis	53	38	40	50	48	51	35
Minn.	Northwestern College of Chiropractic, Minneapolis.	30	19	15	17	13	9	8
Mo.	Logan College of Chiropractic, St. Louis	72	76	72	54	42	50	69
N.Y.	Chiropractic Institute of New York, New York[2]	41	57	52	33	38	40	56
Oreg.	Western States College of Chiropractic, Portland	5	6	9	10	8	7	5
Tex.	Texas Chiropractic College, Pasadena	14	8	14	10	12	4	13
	Schools approved by Chiropractic Education Commission of the International Chiropractors Association, total.[1]	336	332	295	308	386	406	380
Calif.	Cleveland Chiropractic College, Los Angeles	31	37	34	29	36	46	50
Iowa	Palmer College of Chiropractic, Davenport	246	230	212	211	279	275	257
Mo.	Cleveland Chiropractic College, Kansas City	45	34	20	32	41	37	31
N.Y.	Columbia Institute of Chiropractic, New York	14	31	29	36	30	48	42

[1] Schools approved in 1967 but may not have been approved for earlier years.

[2] Closed in 1968.

Source: The American Chiropractic Association and the International Chiropractors Association.

CHAPTER 7

Clinical Laboratory Services*

An estimated 100,000 persons in several occupations are engaged full or part time in providing services within the clinical laboratory setting, in addition to the physicians who specialize in clinical pathology. (See table 81, ch. 18.) Earlier estimates had indicated about 30,000 workers in 1950, 50,000 in 1955, 68,000 in 1960, and upwards of 85,000 in 1965 (table 26).

In order to diagnose and treat illness, clinical laboratory personnel must embrace a wide variety of skills associated with different types of education and experience. Nearly half of the individuals are college graduates, with a bachelor's or higher degree. Others are high school or junior college graduates with varying combinations of formal education, commercial or vocational school training, apprenticeship training in a clinical laboratory, and/or experience, which enables them to work as technicians or assistants.

Statistics on the numbers of clinical laboratory personnel employed in 1967 by location and by type of employer are lacking. The 1966 hospital survey indicated that about 75,000 such persons were employed in 1966: 54,500 technologists, including persons with that job title but without a college degree; 1,600 cytotechnologists; 3,900 histologic technicians; and 14,600 laboratory assistants. In addition, there are about 4,000 laboratory workers employed by State and local health departments (table 9, Introduction) and about 10,000 employed by private independent laboratories. Of the approximately 25,000 or so persons (other than nurses) who perform some laboratory work in physicians' offices, perhaps 10,000 can be considered as laboratory workers. Relatively small numbers—1 to 2,000—work for industry and independent research organizations.

Clinical Laboratory Scientist

Approximately 4,000 scientists with graduate degrees in chemistry, microbiology, or other biological sciences were engaged in the performance of clinical laboratory services in 1967. An academic degree in a specific science followed by a period of work experience in a laboratory is the usual course of entry into this field.

Most of these scientists are employed in clinical laboratories directed by pathologists or other physicians. Others direct their own laboratories or work in these independent laboratories.

The American Association of Clinical Chemists (AACC) had about 1,750 members in 1967. In addition, there are qualified *chemists* who are not AACC members, including some who are affiliated with the American Society of Biological Chemists and the American Chemical Society. The American Board of Clinical Chemistry examines and certifies clinical chemists with a doctorate and extensive experience.

The American Academy of Microbiology is the professional organization of *microbiologists* at the doctoral level, with 760 members in 1967. One of its committees is the American Board of Microbiology which certifies those persons with a doctor's degree.

The Board of Registry of Medical Technologists of the American Society of Clinical Pathologists offers specialist certification in blood banking, chemistry, microbiology, or cytotechnology. Examinations are open to persons with a master's or doctor's degree and 3 years of experience in that field in an acceptable medical laboratory.

Clinical Laboratory Technologist

Technologists, as used here, means (a) persons with a bachelor's degree in chemistry or a biological science, and (b) persons registered with the Board of Registry of Medical Technologists of the American Society of Clinical

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*This chapter was prepared by the Public Health Service, Bureau of Health Manpower, Division of Allied Health Manpower.

Pathologists—MT(ASCP)'s. The number active in 1967 was estimated at 40,000, or about 10 times the staff of scientists in the clinical laboratories.

The number of college graduates—other than those certified as MT(ASCP)—who were employed in a clinical laboratory in 1967 probably exceeded 4,000. Certification is open to technologists who have the requisite training and experience to meet qualifications set by the National Registry in Clinical Chemistry, the National Registry of Microbiologists (a subcommittee of the American Board), and the Board of Registry of Medical Technologists (ASCP). Other registries of *medical technologists* may also include persons with a baccalaureate in one of the sciences.

About 35,600 *MT(ASCP)'s* were engaged in 1967 in the performance of chemical, microscopic, bacteriologic, and other tests under the supervision of a pathologist or other physician (table 27). Some of them serve as laboratory supervisors or assist in the training of student medical technologists and other laboratory personnel. The minimum educational requirement for this medical technologist is 3 years of college plus 12 months of specialized training in a school of medical technology accredited by the AMA Council on Medical Education in collaboration with the ASCP Board of Schools of Medical Technology. In the academic year 1966–67, more than 5,000 students were admitted to the final year of this program. A total of 3,845 were graduated, mo[illegible] them also receiving a baccalaureate from [illegible] affiliated college or university (tables 28 and 29).

National certification examinations given by the Board of Registry of Medical Technologists (ASCP) enable persons with the education prescribed above and who pass the exams to use the professional designation of MT(ASCP). This same Board certifies persons as technologists in *blood banking, chemistry, microbiology,* and *nuclear medicine.*

The American Society of Medical Technologists, with a membership of nearly 11,500 in 1967, is the professional organization of MT(ASCP)'s.

Clinical Laboratory Technician and Assistant

Probably in excess of 50,000 individuals with varying combinations of experience and post high school training were engaged in clinical laboratory work in 1967. Several levels of laboratory jobs have developed over the years for those persons without a college degree. Minimum levels of education and experience have been established for only a few of these positions, such as *cytotechnologist, histologic technician,* and *certified laboratory assistant*—each of which is described below.

About 1,800 *CT(ASCP)'s* were employed in 1967, having received their training in schools of cytotechnology approved by the AMA Council on Medical Education and the ASCP Board of Schools of Medical Technology. These cytotechnologists specialize in screening slides in the search for abnormalities that are warning signs of cancer. Minimum prerequisites include 2 years of college with 12 semester hours in science, 8 of which are in biology. The cytotechnology course provides for 12 months of education, with the second half of this period at an approved school or in an acceptable cytology laboratory. In 1966–67, 348 persons completed their training (tables 30 and 31). Successful completion of national certification examinations given by the Board of Registry of Medical Technologists permits the use of the designation CT(ASCP).

Approximately 3,000 *HT(ASCP)'s* were employed in pathology laboratories in 1967. These histologic technicians specialize in cutting and staining body tissues for microscopic examination. The Board of Registry of Medical Technologists gives limited certification, following examination, to persons with a high school diploma plus 1 year of supervised training in a clinical pathology laboratory. Some hospitals have set up training courses but as yet there is no formal approval of such programs.

Certified laboratory assistants (*CLA*) numbered about 3,300 active in 1967. These assistants usually work under the supervision of the medical technologist, performing the simpler laboratory tests and procedures. Graduation from an accredited high school, preferably with ability and interest in science and mathematics—or an equivalency certificate—is required for admission to a school approved by the ASCP Board of Certified Laboratory Assistants and the American

Society of Medical Technologists. In 1966–67, about 1,100 students were enrolled in the 12-month course of practical and technical training (table 32). Graduates who pass an examination given by the CLA Board may place the letters CLA after their names.

With regard to other clinical laboratory technicians and assistants, training and certification requirements differ widely. Several self-established registries for personnel not under general medical auspices have been established.

Table 26. ESTIMATED NUMBER OF EMPLOYED CLINICAL LABORATORY PERSONNEL: 1965 AND 1967

Occupation and selected certification designations	1965	1967
All occupations [1]	85 to 90, 000	100, 000
Scientists [2]	3, 500	4, 000
Clinical chemists:		
Chemistry diplomate	290	300
SpecC(ASCP)	7	8
Other	--------	--------
Microbiologists:		
Microbiology diplomate	457	467
SpecM(ASCP)	18	28
Other	--------	--------
Other scientists:		
Spec(ASCP), blood banking	2	3
Spec(ASCP), cytotechnology	5	4
Other	--------	--------
Technologists [3]	35, 000	40, 000
Medical technologists:		
MT(ASCP)	30, 800	35, 600
Other	--------	--------
Blood banking technologists:		
BB(ASCP)	476	504
Other	--------	--------
Chemistry technologists:		
Chemistry diplomate	--------	—
C(ASCP)	134	156
Other	--------	--------
Microbiology technologists:		
Microbiology diplomate	--------	637
M(ASCP)	94	123
Other	--------	--------
Nuclear medical technologists:		
NM(ASCP)	85	115
Other	--------	--------
Technicians and assistants [4]	46, 500 to 50, 000	56, 000
Cytotechnologists:		
CT(ASCP)	1, 230	1, 814
Other	--------	--------
Histologic technicians:		
HT(ASCP)	2, 362	3, 075
Other	--------	--------
Other technicians and assistants:		
CLA	1, 080	3, 282
Other	--------	--------

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[1] Excludes physicians; see table 81 for numbers of pathologists—M.D. and D.O.

[2] Persons with a master's or doctor's degree.

[3] Persons with a bachelor's degree or ASCP certified. Replies from a 1967 survey indicated that nearly 91 percent of the MT (ASCP)'s have the equivalent of 4 years of college (*GIST*, issue no. 36. April 1967).

[4] Persons without a college degree. Includes persons trained in the Armed Forces, in commercial schools, or on the job as well as cytotechnologists graduated from AMA-approved schools.

Sources: Public Health Service, Bureau of Health Manpower, Division of Allied Health Manpower for estimates of numbers of scientists, technologists, and technicians and assistants.
Board of Registry of Medical Technologists of the American Society of Clinical Pathologists for counts of certified personnel, including laboratory assistants.
American Board of Clinical Chemistry and National Registry in Clinical Chemistry for counts of diplomates.
National Registry of Microbiologists for counts of diplomates of American Board of Microbiology.

Table 27. NUMBER OF REGISTERED MEDICAL TECHNOLOGISTS: SELECTED YEARS, 1950 THROUGH 1967

Year	Total MT(ASCP)'s [1]	Active MT(ASCP)'s [2]
1967	47, 531	35, 600
1966	44, 250	
1965	41, 063	30, 800
1964	38, 139	
1963	35, 584	
1962	33, 874	
1961	31, 721	
1960	29, 736	22, 300
1955	18, 000	
1950	14, 000	

[1] For the years 1960–67, data show the number certified by the Registry as of June 30 of the following year.

[2] Estimated as three-fourths of the total. Replies from 30,000 of the 43,000 registrants in 1967 indicated that 73 percent worked in medical technology in 1966, full or part time or occasionally (*GIST*, issue No. 36. April 1967).

Source: Board of Registry of Medical Technologists of the American Society of Clinical Pathologists.

Table 28. ACCREDITED SCHOOLS OF MEDICAL TECHNOLOGY, STUDENTS AND GRADUATES: SELECTED YEARS, 1949–50 THROUGH 1966–67

Academic year	Schools	Students [1]	Graduates
1966–67	786	5, 119	3, 845
1965–66	773	4, 752	3, 460
1964–65 [2]	784	4, 648	3, 283
1963–64 [2]	779	4, 291	2, 689
1962–63	776	4, 377	3, 259
1961–62	757	4, 638	2, 809
1960–61	734	4, 086	2, 639
1959–60	702	3, 944	2, 573
1954–55	575	2, 384	1, 956
1949–50			2, 011

[1] Student enrollment is for the year of specialized training, and includes all students admitted during the year. More than half of the schools have 2 or more classes per year.

[2] Final figures based on reports from individual schools, to replace preliminary estimates published in *J.A.M.A.*

Source: Council on Medical Education: Education Number of the *J.A.M.A.* Chicago. American Medical Association. Annual issues.

Table 29. LOCATION OF ACCREDITED SCHOOLS OF MEDICAL TECHNOLOGY AND NUMBERS OF STUDENTS AND GRADUATES: 1966–67

Location	Schools	Students	Graduates
Total schools [1]	786	5, 119	3, 845
Reporting schools	734	5, 037	[2] 3, 666
Alabama	12	119	73
Alaska	-------	-------	-------
Arizona	5	43	25
Arkansas	9	47	28
California	58	396	264
Colorado	17	92	89
Connecticut	14	87	68
Delaware	1	11	5
District of Columbia	9	59	44
Florida	14	84	52
Georgia	15	127	70
Hawaii	5	20	18
Idaho	6	20	14
Illinois	47	273	176
Indiana	18	110	76
Iowa	14	71	72
Kansas	8	63	65
Kentucky	13	85	65
Louisiana	16	116	107
Maine	3	10	10
Maryland	4	41	30
Massachusetts	23	155	73
Michigan	33	197	171
Minnesota	12	153	138
Mississippi	6	33	26
Missouri	21	121	94
Montana	4	21	17
Nebraska	8	88	57
Nevada	2	4	2
New Hampshire	2	18	18
New Jersey	27	126	82
New Mexico	5	17	12
New York	36	204	178
North Carolina	10	80	64
North Dakota	5	39	26
Ohio	46	344	226
Oklahoma	12	94	69
Oregon	6	74	61
Pennsylvania	39	218	190
Rhode Island	4	29	15
South Carolina	8	42	23
South Dakota	6	39	28
Tennessee	18	120	80
Texas	39	359	196
Utah	7	36	29
Vermont	2	17	24
Virginia	11	105	66
Washington	11	94	76
West Virginia	7	62	38
Wisconsin	32	201	185
Wyoming	1	8	5
Canal Zone	1	5	6
Puerto Rico	2	60	40

[1] Totals for students and graduates are approximate number for all schools. Student totals include classes in session during entire 1966–67 academic period; graduate totals include only students completing studies in this period. More than half of the schools have 2 or more classes beginning during the year.

[2] In 1966–67, 93 schools reported no graduates and 153 reported only 1 or 2 graduates during the year.

Source: Public Health Service, Bureau of Health Manpower, Division of Allied Health Manpower—unpublished data based on annual reports of the schools to the Council on Medical Education of the American Medical Association.

Table 30. APPROVED SCHOOLS OF CYTOTECHNOLOGY, STUDENTS, AND GRADUATES: 1962–63 THROUGH 1966–67

Academic year	Schools	Students	Graduates
1966–67	98	429	348
1965–66	92	375	325
1964–65	84	340	332
1963–64	79	330	291
1962–63	77	352	292

Source: Council on Medical Education: Education number of the *J.A.M.A.* Chicago. American Medical Association. Annual issues.

Table 31. LOCATION OF APPROVED SCHOOLS OF CYTOTECHNOLOGY AND NUMBERS OF STUDENTS AND GRADUATES: 1966–67

Location	Schools	Students	Graduates	Location	Schools	Students	Graduates
Total schools	98	429	348	Minnesota	1	6	5
				Mississippi	1	1	1
Reporting schools	89	413	[1] 327	Missouri	1	4	4
				Nebraska	—	—	—
Alabama	1	9	7	New York	7	33	31
California	4	40	26	North Carolina	8	14	11
Colorado	1	2	4	Ohio	9	37	29
Connecticut	3	12	13	Oklahoma	1	6	6
District of Columbia	1	4	4	Oregon	1	8	7
Florida	3	14	11	Pennsylvania	7	29	26
Georgia	2	14	11	Rhode Island	2	12	8
Illinois	3	29	21	South Carolina	2	7	4
Indiana	2	3	5	Tennessee	3	17	16
Iowa	3	7	—	Texas	6	23	22
Kansas	1	6	4	Utah	1	3	3
Kentucky	1	9	8	Virginia	3	12	8
Louisiana	1	6	6	Washington	3	8	7
Maryland	1	8	2	West Virginia	1	6	2
Massachusetts	—	—	—	Wisconsin	2	13	7
Michigan	2	6	4	Puerto Rico	1	5	4

[1] In 1966–67, 18 schools reported no graduates and 19 schools reported only 1 or 2 graduates during that year.

Source: Public Health Service, Bureau of Health Manpower, Division of Allied Health Manpower—unpublished data based on annual reports of the schools to the Council on Medical Education of the American Medical Association.

Table 32. LOCATION OF APPROVED SCHOOLS FOR THE TRAINING OF CERTIFIED LABORATORY ASSISTANTS AND STUDENT CAPACITY: AUGUST 1967

Location	Schools	Student Capacity	Location	Schools	Student Capacity
Total	148	[1] 1,234	Mississippi	1	6
			New Hampshire	1	8
Alabama	2	14	New Jersey	7	42
Arkansas	1	4	New York	6	47
Connecticut	4	18	North Carolina	4	54
Delaware	2	14	Ohio	11	63
District of Columbia	1	20	Pennsylvania	23	220
Florida	5	42	Rhode Island	1	6
Georgia	4	30	South Carolina	3	42
Illinois	10	72	South Dakota	1	2
Indiana	5	56	Tennessee	3	25
Iowa	1	8	Texas	10	54
Kansas	1	15	Vermont	2	8
Kentucky	3	22	Virginia	9	66
Maine	1	4	Washington	1	18
Maryland	2	21	West Virginia	7	47
Massachusetts	4	19	Wisconsin	7	64
Michigan	1	6			
Minnesota	3	92	Japan	[2] 1	5

[1] Total enrollment estimated at 1,100 students; information not available on enrollment and graduates for individual schools in 1966–67.

[2] USAF hospital school.

Source: National Committee for Careers in Medical Technology—unpublished data provided by the Board of Certified Laboratory Assistants (ASCP).

CHAPTER 8

Dentistry and Allied Services*

Dentistry is that branch of the health professions responsible for maintaining and improving the health of the teeth and related structures. Early diagnosis and treatment of tooth decay, periodontal disease, malocclusion, and other oral disorders make possible proper mastication of food, and contribute toward normal speech and facial appearance. Prompt detection of oral cancer and other systemic conditions which manifest themselves in the mouth is necessary for the maintenance of general health.

Modern dentistry places great emphasis upon the prevention and control of dental disease, through such measures as the early detection and correction of diseases of the teeth and supporting structures, fluoridation, and dental health education. Educational programs stress the importance of proper diet, correct oral hygiene practices, and the importance of regular dental examinations. Dental research, both basic and applied, is another increasingly important component of professional activity.

The dental work force consists of dentists and three allied occupational groups—dental hygienists, dental assistants, and dental laboratory technicians. In 1967, the active dental manpower supply numbered about 235,700 according to estimates prepared by the Public Health Service.

Dental occupation:	*Number of persons*
Dentists	98, 670
Dental hygienists	15, 000
Dental assistants	95, 000
Dental laboratory technicians	27, 000

Training facilities for dentists and dental auxiliaries are being established on a continuing basis as a result of the increasing demand for dental services. The Council on Dental Education of the American Dental Association accredits dental and dental auxiliary training programs. All dental schools hold institutional membership in the American Association of Dental Schools.

Dentists

In mid-1967 there was a total of 112,150 dentists in the United States, excluding the 1967 graduates. Of the 98,670 active dentists, about 90,715 were non-Federal dentists located in the 50 States and the District of Columbia, and 7,955 were Federal dentists in the Armed Forces, Public Health Service, and Veterans' Administration. The remaining 13,480 dentists were retired or engaged in nondental activities. In 1967, the American Dental Association, a nationwide professional organization for dentists, had 93,522 members.

The Nation's supply of dentists in relation to the civilian population declined sharply between 1950 and 1960 (table 33). Even though the downward trend in the dentist-to-population ratio leveled off in the midsixties, the ratio still remains considerably below the 1950 level. In 1950, there were 50 active non-Federal dentists per 100,000 civilians, while in 1967 the ratio stood at 46 per 100,000.

The distribution of dentists by State varied widely in 1967, ranging from 67 active non-Federal dentists per 100,000 civilians in New York to 23 in South Carolina (table 34). In general, States in the Northeast and Far West had dentist-population ratios more favorable than the national average, while the South and Southwest had the least satisfactory supply of dentists.

Almost all dentists provide care to patients, primarily in private dental offices, but also in public and private clinics and hospitals, military installations, and other institutions. Diagnosis and treatment of existing oral diseases and abnormalities may involve filling decayed teeth, treatment of soft and hard tissues surrounding teeth, extraction of teeth, provision of artificial teeth and dentures, and straightening of teeth. Dentists may also provide preventive services including topical application of fluorides, scaling and polishing of teeth, and adjustment of occlusion.

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*This chapter was prepared by the Public Health Service, Division of Dental Health, Resource Analysis Branch—Dr. Stanley Lotzkar, Chief.

Some active dentists are primarily engaged in nonclinical activities, such as teaching, research, or administration of dental programs. These dentists are employed by dental schools, public health departments, dental societies, and various other public and private organizations. A number of dentists in private practice also devote a part of their professional time to teaching and research and to voluntary community services, such as examination of school children's teeth.

Although most dentists are general practitioners, the number of specialists has increased rapidly in recent years, showing a threefold increase from 1955 to 1966 (table 35). In 1966, some 9,174 dentists were recognized by the American Dental Association as specialists in eight areas of dentistry. Over two-fifths, or some 4,000, of the specialists limited their practice exclusively to orthodontics (straightening of teeth). The next largest group, about 2,200, specialized in oral surgery, followed by approximately 1,000 in pedodontics (dentistry for children). Only one-fifth of the specialists engaged in one of the other five recognized areas—periodontics (treatment of gums and underlying bone), prosthodontics (providing artificial replacements for missing teeth), endodontics (root canal therapy), public health dentistry, and oral pathology.

In each State and the District of Columbia, a dentist (D.D.S. or D.M.D.) must be a graduate of an accredited dental school and must obtain a license before practicing dentistry. Dentists receive 4 years of professional education in a dental school, following 2 or more years of predental college training. In the academic year 1966–67, one-half of all dental students had earned a bachelor's degree prior to entering dental school, while another one-third had completed 3 years of predental college work. To qualify for licensure in a State, dental school graduates must pass both a written and a clinical examination. In 1967, 41 States accepted the written examination given by the National Board of Dental Examiners in lieu of the State's own written examination; however, each State still examines the clinical skills of the candidate.

Nine new dental schools have been established since 1950 and several others have expanded their training facilities. As a result, the number of annual graduates had increased about 30 percent by 1967, even though the annual number of graduates remained fairly constant from 1960 through 1966 (table 36). In 1967, a total of 3,360 dentists were graduated from the 50 dental schools in the United States and Puerto Rico (table 37). Undergraduate enrollment reached a new high of 14,955 in the 1967–68 academic year.

A comparatively small number of dentists have immigrated to the United States in recent years. In 1966, a total of 209 dentists entered the United States from some 40 foreign countries.

Dental Hygienists

Dental hygienists are the only dental auxiliaries who provide service directly to the patient, and who, like dentists, are required in each State to obtain a license to practice. The hygienist, working under the direction of a dentist, performs prophylaxes (scaling and polishing of the teeth), exposes and processes dental X-ray films, applies fluoride solution to children's teeth, instructs individual patients in toothbrushing techniques and proper diet as related to the teeth, and performs other duties in conformity with her training and licensing.

In 1967, an estimated 15,000 dental hygienists were in practice. Approximately 7,000 hygienists are members of the American Dental Hygienists' Association. Since 1950, the number of active hygienists has increased by about 8,000, but there are still only 16 active hygienists per 100 practicing dentists. Because part-time employment is common, the supply of hygienists is actually not as favorable as this ratio suggests.

The great majority of dental hygienists provide services to patients, working primarily in private dental offices, but also in public and parochial schools, public and private clinics, hospitals, and other institutions. Some hygienists, however, are engaged in other activities, such as determining dental treatment needs of school children, reporting these findings to parents, and giving dental health talks in classrooms.

Dental hygienists receive at least 2 years of education at the college level. The dental hygiene curriculum, which includes basic sciences, dental sciences, and liberal arts, is usually open to high school graduates. However, in 1967, one institution out of every five required some college training for admission to this program. Originally, dental hygiene programs were provided primarily by schools of dentistry, but increasing numbers of junior colleges and technical schools are now offering this training.

Two types of college training are available to the hygiene student. The 2-year associate degree or certificate program qualifies a hygienist for clinical practice. The level of training required for leadership positions in teaching and public health is provided by the 4-year bachelor's degree program in dental hygiene. Hygienists completing the latter program qualify for graduate training leading to the master's degree in related fields.

The number of schools offering dental hygiene programs has increased significantly in recent years, from 37 in 1960 to 67 in 1967 (table 38). As a result, the number of students in training increased by approximately 75 percent during this period. Enrollment in academic year 1967–68 totaled 4,332 students, and 1,729 hygienists were graduated in 1967 (table 39). The bachelor's degree program was offered by 26 schools in 1967, including 16 schools which offered both the 2-year and 4-year programs. The remaining 41 schools offered only the associate degree or certificate in dental hygiene.

Dental Assistants

The dental assistant's primary function, that of assisting the dentist at the chairside, includes preparing the patient for treatment, keeping the operating field clear, mixing filling materials, and passing instruments. Other duties involve exposing and processing X-ray films, sterilizing instruments, assisting with laboratory work, ordering supplies, and handling the office records and accounts.

All dental schools now routinely train dental students in the effective utilization of chairside assistants. The utilization of assistants has progressively increased until today more than four out of every five dentists in private practice employ at least one dental assistant. An estimated 95,000 persons were employed as dental assistants in 1967 as compared with only 55,200 in 1950. Dental assistants usually work full time.

Traditionally, dental assistants have been trained on the job by their dentist-employers. However, the number of institutions offering accredited training programs for assistants has increased substantially from 26 in 1961 to 101 in 1967, a fourfold expansion within this 6-year period (table 40). To be accredited, a program must provide at least 1 academic year of training in dental assisting. However, 2-year programs are also available in which the required training in dental assisting is supplemented with another year of general education.

The 2-year training program leading to an associate degree or certificate was offered by 34 institutions in 1967, including six that provided both the 2-year and the 1-year certificate programs. The remaining 67 schools offered only the 1-year program. In the academic year 1967–68, 3,819 students were in training (table 41). The number graduating reached 1,963 in 1967.

Experienced dental assistants who are graduates of either the 1-year or the 2-year accredited training program, or who have completed equivalent training, are eligible to be certified by the Certifying Board of the American Dental Assistant's Association. Of some 16,200 members of the Association in 1967, approximately 6,000 were certified.

Dental Laboratory Technicians

Dental laboratory technicians are highly skilled craftsmen who perform many tasks involved in the construction of complete and partial dentures, fixed bridgework, crowns, and other such dental restorations and appliances. Dentists are relieved of many time-consuming procedures by utilizing the skills of technicians who perform such tasks as waxing, investing, casting, soldering, finishing, and polishing. Technicians do not have direct contact with patients, but perform their work in accordance with instructions received from the dentist.

Dental laboratory technicians may be employed in a dental office and work directly for a dentist. Most technicians, however, are employed in commercial dental laboratories which serve the majority of the Nation's dentists.

The number of technicians has increased from about 21,000 in 1950 to an estimated 27,000 in 1967. Approximately 21,500 technicians work in 6,700 commercial dental laboratories, and 5,500 technicians are employed by dentists in private practice. The Joint Commission on Accreditation of Dental Laboratories was established in 1963 to accredit commercial laboratories. In 1967, there were 350 dental laboratories, representing more than 40 States and the District of Columbia, which were accredited by the Joint Commission.

Relatively few formal educational programs for dental laboratory technicians are available at the present time. In 1967, only 15 accredited institutions offered 2-year academic programs, and nine of these schools were established within the last 2 years. During academic year 1967–68, 729 students were enrolled in these accredited programs, which provide one year of basic and dental sciences and a second year of supervised practical laboratory experience. However, the graduate total of only 162 technicians in 1967 does not yet reflect the recent establishment of a number of new training programs (table 42).

Most technicians receive on-the-job training in commercial laboratories or dental offices. A formal apprenticeship program for dental technicians was established in 1965. Apprentices receive approximately 8,000 hours of on-the-job training, including a minimum of 144 hours of related supplemental instruction.

There were approximately 6,800 certified dental laboratory technicians in 1967. Technicians who have completed the 2-year accredited curriculum and 3 years of employment experience, or who have fulfilled other requirements in lieu of the formal training, may be certified after passing an examination given by the National Board for Certification of the National Association of Certified Dental Laboratories.

Table 33. DENTISTS IN RELATION TO POPULATION: SELECTED YEARS, JULY 1, 1950, THROUGH 1967

Dentists and population	1950	1960	1967
Total dentists [1]	87, 164	101, 947	112, 152
Total population (thousands) [2]	152, 271	180, 684	199, 118
Dentists per 100,000 population	57. 2	56. 4	56. 3
Active non-Federal dentists	75, 313	82, 630	90, 716
Resident civilian population (thousands)	150, 790	178, 153	195, 669
Active non-Federal dentists per 100,000 civilians	49. 9	46. 4	46. 4

[1] Excludes graduates of years which are specified, but includes all other dentists, active or inactive.

[2] Includes all persons in the United States and in the Armed Forces overseas.

Sources: Total dentist data—Bureau of Economic Research and Statistics: *Distribution of Dentists in the United States by State, Region, District and County*. Chicago. American Dental Association. Annual issues and unpublished 1967 data. Adjustments to exclude graduates of specified years made by Division of Dental Health, Public Health Service.

Active dentist data—Estimates prepared by the Division of Dental Health, Public Health Service.

Population data—U.S. Bureau of the Census: Population estimates. *Current Population Reports*, Series P–25, No. 386, February 1968.

Table 34. NUMBER OF NONFEDERAL DENTISTS AND RATE PER 100,000 CIVILIANS: JULY 1, 1967

Location	Civilian population in thousands [1]	Number of non-Federal dentists [2]		Rate per 100,000 civilians	
		Total	Active	Total dentists	Active dentists
United States	195, 669	104, 195	90, 716	53	46
Alabama	3, 505	1, 117	1, 015	32	29
Alaska	238	84	79	35	33
Arizona	1, 606	703	632	44	39
Arkansas	1, 958	617	549	32	28
California	18, 793	11, 699	10, 245	62	55
Colorado	1, 927	1, 174	1, 036	61	54
Connecticut	2, 912	1, 918	1, 705	66	59
Delaware	515	222	205	43	40
District of Columbia	793	772	670	97	84
Florida	5, 902	2, 951	2, 559	50	43
Georgia	4, 389	1, 346	1, 220	31	28
Hawaii	684	466	422	68	62
Idaho	695	330	301	47	43
Illinois	10, 825	6, 286	5, 323	58	49
Indiana	4, 989	2, 242	1, 952	45	39
Iowa	2, 752	1, 547	1, 292	56	47
Kansas	2, 255	997	847	44	38
Kentucky	3, 142	1, 172	1, 036	37	33
Louisiana	3, 622	1, 333	1, 194	37	33
Maine	958	426	350	44	37
Maryland	3, 606	1, 590	1, 443	44	40
Massachusetts	5, 387	3, 838	3, 294	71	61
Michigan	8, 564	4, 426	3, 951	52	46
Minnesota	3, 577	2, 482	2, 092	69	58
Mississippi	2, 320	649	587	28	25
Missouri	4, 565	2, 323	1, 922	51	42
Montana	691	365	318	53	46
Nebraska	1, 423	920	765	65	54
Nevada	437	206	194	47	44
New Hampshire	681	306	271	45	40
New Jersey	6, 947	4, 248	3, 736	61	54
New Mexico	985	320	291	32	30
New York	18, 303	14, 298	12, 237	78	67
North Carolina	4, 913	1, 547	1, 382	31	28
North Dakota	627	290	242	46	39
Ohio	10, 437	5, 097	4, 424	49	42
Oklahoma	2, 447	982	863	40	35
Oregon	1, 994	1, 489	1, 314	75	66
Pennsylvania	11, 612	6, 539	5, 565	56	48
Rhode Island	875	474	415	54	47
South Carolina	2, 526	634	569	25	23
South Dakota	667	299	247	45	37
Tennessee	3, 858	1, 574	1, 426	41	37
Texas	10, 657	3, 918	3, 530	37	33
Utah	1, 020	621	554	61	54
Vermont	416	200	173	48	42
Virginia	4, 349	1, 732	1, 583	40	36
Washington	3, 029	2, 101	1, 869	69	62
West Virginia	1, 797	634	545	35	30
Wisconsin	4, 185	2, 542	2, 150	61	51
Wyoming	311	149	132	48	42

[1] State figures do not add to total due to rounding.

[2] Excludes graduates of the 1967 class.

Sources: Total dentist data—Bureau of Economic Research and Statistics: American Dental Association. Chicago. Unpublished data. Adjustment to exclude 1967 graduates made by Division of Dental Health, Public Health Service.
Active dentist data—Estimates prepared by Division of Dental Health, Public Health Service.
Population data—U.S. Bureau of the Census: Population estimates. *Current Population Reports*, Series P-25, No. 380, November 1967.

Table 35. NUMBER OF DENTAL SPECIALISTS: 1955, 1960, AND 1966

Specialist	1955	1960	1966	Specialist	1955	1960	1966
All specialists	3, 034	4, 170	9, 174	Orthodontists	1, 521	2, 097	3, 999
				Pedodontists	148	229	1, 010
Endodontists [1]	------	------	367	Periodontists	245	307	804
Oral pathologists	24	42	68	Prosthodontists	225	278	613
Oral surgeons	844	1, 183	2, 227	Public health dentists	27	34	86

[1] Endodontics was not recognized as a dental specialty in 1955 or 1960.

Source: Bureau of Economic Research and Statistics: *Facts About States for the Dentist Seeking a Location*. Chicago. American Dental Association. Annual issues and unpublished 1966 data.

Table 36. DENTAL SCHOOLS, STUDENTS, AND GRADUATES: SELECTED YEARS, 1949–50 THROUGH 1967–68

Academic year	Schools	Students	Graduates	Academic year	Schools	Students	Graduates
1967–68	50	14, 955	[1] 3, 450	1961–62	47	13, 513	3, 207
1966–67	49	14, 421	3, 360	1960–61	47	13, 580	3, 290
1965–66	49	14, 020	3, 198	1959–60	47	13, 581	3, 253
1964–65	49	13, 876	3, 181	1954–55	43	12, 601	3, 081
1963–64	48	13, 691	3, 213	1949–50	41	11, 460	2, 565
1962–63	48	13, 576	3, 233				

[1] Estimated.

Source: Council on Dental Education: *Dental Student's Register*. Chicago. American Dental Association. Annual issues. Also *Annual Report on Dental Education, 1967–68—Part 1.*

Table 37. LOCATION AND OWNERSHIP OF DENTAL SCHOOLS AND NUMBERS OF STUDENTS AND GRADUATES: 1967

State	School	Ownership	Students (1967–68)	Graduates (1967)
	Total, 50 schools		14, 955	3, 360
Ala	University of Alabama School of Dentistry, Birmingham.	Public	198	50
Calif	University of Pacific, College of Physicians & Surgeons, School of Dentistry, San Francisco.	Private	270	46
	Loma Linda University School of Dentistry, Loma Linda.	do	232	56
	University of California School of Dentistry, San Francisco.	Public	297	68
	University of California at Los Angeles School of Dentistry, Los Angeles.	do	231	(1)
	University of Southern California School of Dentistry, Los Angeles.	Private	426	84
D.C	Georgetown University School of Dentistry, Washington.	do	393	87
	Howard University College of Dentistry, Washington	do	310	49
Ga	Emory University School of Dentistry, Atlanta	do	309	73
Ill	Loyola University of Chicago School of Dentistry, Chicago.	do	360	91
	Northwestern University Dental School, Chicago	do	308	65
	University of Illinois College of Dentistry, Chicago	Public	351	65

See footnotes at end of table.

Table 37. LOCATION AND OWNERSHIP OF DENTAL SCHOOLS AND NUMBERS OF STUDENTS AND GRADUATES: 1967—Continued

State	School	Ownership	Students (1967–68)	Graduates (1967)
Ind	Indiana University School of Dentistry, Indianapolis	Public	378	85
Iowa	State University of Iowa College of Dentistry, Iowa City.	do	219	48
Ky	University of Kentucky College of Dentistry, Lexington	do	179	39
	University of Louisville School of Dentistry, Louisville	Private	217	49
La	Loyola University School of Dentistry, New Orleans	do	225	50
Md	University of Maryland School of Dentistry, Baltimore	Public	381	93
Mass	Harvard University School of Dental Medicine, Boston	Private	51	17
	Tufts University School of Dental Medicine, Boston	do	399	95
Mich	University of Detroit School of Dentistry, Detroit	do	301	61
	University of Michigan School of Dentistry, Ann Arbor	Public	357	78
Minn	University of Minnesota School of Dentistry, Minneapolis.	do	414	95
Mo	St. Louis University School of Dentistry, St. Louis	Private	235	45
	University of Missouri at Kansas City School of Dentistry, Kansas City.	Public	466	110
	Washington University School of Dentistry, St. Louis	Private	195	45
Nebr	Creighton University School of Dentistry, Omaha	do	186	45
	University of Nebraska College of Dentistry, Lincoln	Public	166	35
N.J	Fairleigh Dickinson University School of Dentistry, Teaneck.	Private	199	46
	New Jersey College of Medicine and Dentistry, Jersey City.	Public	178	46
N.Y	Columbia University School of Dental and Oral Surgery, New York.	Private	131	30
	New York University College of Dentistry, New York	do	658	164
	State University of New York at Buffalo School of Dentistry, Buffalo.	Public	279	62
N.C	University of North Carolina School of Dentistry, Chapel Hill.	do	198	46
Ohio	Ohio State University College of Dentistry, Columbus	do	588	123
	Case Western Reserve University School of Dentistry, Cleveland.	Private	246	65
Oreg	University of Oregon Dental School, Portland	Public	311	74
Pa	Temple University School of Dentistry, Philadelphia	Private	492	125
	University of Pennsylvania School of Dental Medicine, Philadelphia.	do	533	105
	University of Pittsburgh School of Dentistry, Pittsburgh.	do	420	96
S.C	Medical College of South Carolina, Charleston	Public	24	(2)
Tenn	Meharry Medical College School of Dentistry, Nashville	Private	121	19
	University of Tennessee College of Dentistry, Memphis	Public	377	130
Tex	Baylor University College of Dentistry, Dallas	Private	385	88
	University of Texas Dental Branch, Houston	Public	389	96
Va	Medical College of Virginia School of Dentistry, Richmond.	do	296	75
Wash	University of Washington School of Dentistry, Seattle	do	293	63
W. Va	West Virginia University School of Dentistry, Morgantown.	do	201	39
Wis	Marquette University School of Dentistry, Milwaukee	Private	462	110
P.R	University of Puerto Rico School of Dentistry, San Juan.	Public	120	34

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[1] 1st graduating class in 1968.

[2] 1st graduating class in 1971.

Source: Council on Dental Education, *Annual Report on Dental Education, 1967-68—Part 1.* American Dental Association. Chicago. June 1968.

Table 38. SCHOOLS FOR TRAINING DENTAL HYGIENISTS, STUDENTS, AND GRADUATES: SELECTED YEARS, 1949–50 THROUGH 1967–68

Academic year	Schools	Students	Graduates	Academic year	Schools	Students	Graduates
1967–68	67	4, 309	[1] 1, 800	1961–62	43	2, 752	1, 219
1966–67	58	4, 041	1, 739	1960–61	37	2, 497	1, 023
1965–66	56	3, 863	1, 650	1959–60	34	2, 237	992
1964–65	53	3, 502	1, 491	1954–55	31	1, 938	857
1963–64	49	3, 278	1, 429	1949–50	18	1, 091	529
1962–63	47	3, 005	1, 257				

[1] Estimated.

Source: Council on Dental Education: *Dental Student's Register*. Chicago. American Dental Association. Annual issues. Also *Annual Report on Dental Auxiliary Education, 1967–68.*

Table 39. LOCATION AND OWNERSHIP OF SCHOOLS FOR TRAINING DENTAL HYGIENISTS, AND NUMBERS OF STUDENTS AND GRADUATES: 1967

State	School	Ownership	Students (1967–68)	Graduates (1967)
	Total, 67 schools [1]		4, 309	1, 739
Calif	Diablo Valley College, Pleasant Hill	Public	34	15
	Foothill College, Los Altos Hills	do	34	16
	Loma Linda University, Loma Linda**	Private	64	25
	University of California, San Francisco**	Public	48	23
	University of Southern California, Los Angeles**	Private	79	35
Colo	Rangely College of Mesa County Junior College, Rangely.	Public	39	12
Conn	University of Bridgeport, Fones School of Dental Hygiene, Bridgeport.*	Private	131	63
D.C	Howard University, Washington	do	33	19
Fla	Palm Beach Junior College, Lake Worth	Public	71	35
	Pensacola Junior College, Pensacola	do	72	28
	St. Petersburg Junior College, St. Petersburg	do	50	23
Ga	Medical College of Georgia, School of Allied Health Sciences, Augusta.**	do	10	(2)
Hawaii	University of Hawaii, Honolulu	do	46	10
Idaho	Idaho State University, Pocatello*	do	27	7
Ill	Bloom Community College, Chicago Heights	do	22	(3)
	Lake Land College, Matoon	do	22	(3)
	Northwestern University, Chicago	Private	54	26
	Southern Illinois University, Vocational Technical Institute, Carbondale.	Public	70	22
Ind	Indiana University, Indianapolis*	do	75	35
	Indiana University, Fort Wayne Regional Campus*	do	45	12
Iowa	State University of Iowa, Iowa City**	do	71	34
Ky	University of Louisville, Louisville*	Private	40	
	University of Kentucky, School of Allied Health Professions, Lexington.**	Public	12	(3)
La	Loyola University, New Orleans*	Private	63	25
Maine	Westbrook Junior College, Portland	do	52	20
Mass	Forsyth School for Dental Hygienists, Boston	do	204	95
Mich	Ferris State College, Big Rapids	Public	74	22
	Flint Community Junior College, Flint	do	20	(3)
	University of Detroit, Detroit*	Private	89	36
	University of Michigan, Ann Arbor*	Public	80	35
Minn	University of Minnesota, Minneapolis	do	94	29

See footnotes at end of table.

Table 39. LOCATION AND OWNERSHIP OF SCHOOLS FOR TRAINING DENTAL HYGIENISTS, AND NUMBER OF STUDENTS AND GRADUATES: 1967—Continued

State	School	Ownership	Students (1967–68)	Graduates (1967)
Mo.	University of Missouri at Kansas City**	Public	53	25
Nebr.	University of Nebraska, Lincoln*	do.	24	9
N.J.	Fairleigh Dickinson University, Teaneck*	Private	99	32
N. Mex.	University of New Mexico, Albuquerque	Public	44	19
N.Y.	Broome Technical Community College, Binghamton	do.	81	28
	City University of New York, New York City Community College of Applied Arts and Sciences, Brooklyn.	do.	141	73
	Columbia University, New York**	Private	46	24
	Erie County Technical Institute, Buffalo	Public	105	67
	Hudson Valley Community College, Troy	do.	108	38
	Monroe Community College, Rochester	do.	82	42
	Onondaga Community College, Syracuse	do.	36	29
	State University of New York Agricultural and Technical Institute at Farmingdale, Long Island.	do.	176	60
N.C.	Central Piedmont Community College, Charlotte	do.	73	32
	Wayne Technical Institute, Goldsboro	do.	31	10
	University of North Carolina, Chapel Hill*	do.	37	14
N. Dak.	North Dakota State School of Science, Wahpeton	do.	24	10
Ohio	Cuyahoga Community College, Cleveland	do.	42	18
	Ohio State University, Columbus*	do.	155	75
	University of Cincinnati, Cincinnati	do.	25	(3)
Oreg.	University of Oregon, Portland	do.	59	28
Pa.	Temple University, Philadelphia*	Private	111	53
	University of Pennsylvania, Philadelphia	do.	80	31
	University of Pittsburgh, Pittsburgh	do.	87	31
R.I.	University of Rhode Island, Kingston	Public	48	14
S.C.	Richland Technical Education Center, Columbia	do.	43	(3)
S. Dak.	University of South Dakota, Vermillion	do.	12	(3)
Tenn.	Meharry Medical College, Nashville	Private	15	5
	University of Tennessee, Memphis	Public	98	47
Tex.	Baylor University, Caruth School of Dental Hygiene, Dallas.*	Private	77	38
	University of Texas, Houston	Public	70	27
Vt.	University of Vermont, Burlington	do.	34	16
Va.	Old Dominion College, Norfolk	do.	40	(3)
Wash.	University of Washington, Seattle**	do.	45	16
W. Va.	West Liberty State College, West Liberty*	do.	91	33
	West Virginia University, Morgantown**	do.	76	12
Wis.	Marquette University, Milwaukee*	Private	116	62

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[1] A total of 83 programs are offered in the 67 schools. Schools offering a 4-year program only are designated with a double asterisk (**); those schools providing both 4-year and 2-year programs are designated with a single asterisk (*). The remaining schools with no special designation, offer a 2-year program only.

[2] 1st graduating class in 1970.

[3] 1st graduating class in 1969.

Source: Council on Dental Education. *Annual Report on Dental Auxiliary Education, 1967–68.* American Dental Association. Chicago. June 1968.

Table 40. INSTITUTIONS OFFERING DENTAL ASSISTANT TRAINING PROGRAMS, STUDENTS, AND GRADUATES: 1961–62 THROUGH 1967–68

Academic year [1]	Institutions	Students	Graduates	Academic year [1]	Institutions	Students	Graduates
1967–68	101	3, 819	[2] 2, 200	1963–64	44	1, 551	895
1966–67	81	3, 159	1, 963	1962–63	35	1, 419	718
1965–66	64	2, 798	1, 593	1961–62	26	1, 181	658
1964–65	50	1, 919	1, 241				

[1] Data available only since 1961–62.

[2] Number is estimated.

Source: Council on Dental Education: *Dental Students' Register*. Chicago. American Dental Association. Annual issues, Also *Annual Report on Dental Auxiliary Education, 1967–68.*

Table 41. LOCATION AND OWNERSHIP OF INSTITUTIONS OFFERING DENTAL ASSISTANT TRAINING PROGRAMS AND NUMBERS OF STUDENTS AND GRADUATES: 1967

State	Institution	Ownership	Students (1967–68)	Graduates (1967)
	Total, 101 institutions [1]		3, 819	1, 963
Ariz.	Phoenix Dental Assisting School, Phoenix	Public	28	20
Calif.	Cabrillo College, Aptos**	do	39	12
	Cerritos College, Norwalk*	do	115	57
	Chabot College, Hayward**	do	55	20
	Chaffey College, Alta Loma	do	38	30
	Citrus College, Azusa**	do	74	26
	City College of San Francisco, San Francisco**	do	71	25
	Contra Costa College, San Pablo*	do	18	13
	Diablo Valley College, Pleasant Hill**	do	43	15
	Foothill College, Los Altos Hills**	do	42	13
	Fullerton Junior College, Fullerton**	do	121	40
	Grossmont College, El Cajon**	do	114	20
	Laney College, Oakland*	do	43	25
	Long Beach City College, Long Beach*	do	45	20
	Los Angeles City College, Los Angeles*	do	140	47
	College of Marin, Kentfield**	Private	49	26
	Modesto Junior College, Modesto**	Public	36	13
	Monterey Peninsula College, Monterey	do	35	21
	Orange Coast College, Costa Mesa**	Private	78	27
	Pasadena City College, Pasadena**	Public	80	12
	Reedley College, Reedley**	do	56	27
	Sacramento City College, Sacramento**	do	75	30
	San Diego Mesa College, San Diego*	do	114	28
	San Jose City College, San Jose**	do	48	12
	College of San Mateo, San Mateo**	Private	105	29
	Santa Rosa Junior College, Santa Rosa**	Public	60	14
	College of the Siskiyous, Weed**	do	12	6
Colo.	Emily Griffith Opportunity School, Denver	do	22	12
Conn.	J. M. Wright Technical School, Stamford	do	16	10
Fla.	Lindsey Hopkins Educational Center, Miami	do	29	25
	Palm Beach Junior College, Lake Worth	do	33	23
	Pensacola Junior College, Pensacola	do	17	11
	Tomlinson Adult Education Center, St. Petersburg	do	28	24
Ga.	The Atlanta Area Technical School, Atlanta	do	13	12
Hawaii	Kapiolani Community College, Honolulu	do	19	17
Idaho	Boise Junior College, Boise	do	20	17

See footnotes at end of table.

Table 41. LOCATION AND OWNERSHIP OF INSTITUTIONS OFFERING DENTAL ASSISTANT TRAINING PROGRAMS AND NUMBERS OF STUDENTS AND GRADUATES: 1967—Continued

State	School	Ownership	Students (1967–68)	Graduates (1967)
Ill.	Bloom Community College, Chicago Heights	Public	18	20
	Lake Land College, Mattoon	do	22	(2)
	Loyola University School of Dentistry, Chicago	Private	6	6
	Morton Junior College, Cicero**	Public	16	5
	Rock Valley College, Rockford	do	24	10
	University of Illinois, Chicago	Private	26	24
Ind.	Indiana University—Fort Wayne Regional Campus, Ft. Wayne.	Public	30	18
Iowa	Area Six Community College, Marshalltown	do	15	(2)
	Area XI Community College, West Desmoines	do	21	(2)
Kans.	Haskell Institute—PHS Health Center, Lawrence	do	9	8
Ky.	Jefferson Area Vocational School, Jeffersontown	do	12	29
Md.	Montgomery Junior College, Takoma Park**	do	30	13
Mass.	Beth Israel Hospital, Boston	Private	12	16
	Fanning Trade High School, Worcester	Public	24	21
	Northeastern University, Boston	Private	157	108
	Springfield Technical Institute, Springfield	Public	30	30
	University Hospital, Boston University, Boston	Private	29	26
Mich.	Ferris State College, Big Rapids**	Public	145	21
	Flint Community Junior College, Flint	do	20	10
	Grand Rapids Junior College, Grand Rapids**	do	24	5
	Northwestern Michigan College, Traverse City**	do	25	3
	Oakland Community College, Union Lake	do	35	3
	University of Detroit, Detroit	Private	17	12
Minn.	Brainerd Area Vocational Technical School, Brainerd	Public	18	16
	Hibbing Area Technical Institute, Hibbing	do	16	8
	University of Minnesota, Minneapolis	do	38	37
Mo.	Meramec Community College, Kirkwood	do	27	26
	Metropolitan Junior College, Kansas City**	do	28	(2)
Nebr.	Lincoln Community College, Lincoln	do	28	14
	Omaha Public School of Dental Assisting, Omaha	do	18	17
N.J.	Essex County Adult Technical School, Newark	do	43	37
	Union County Technical Institute, Scotch Plains	do	19	16
N. Mex.	University of New Mexico, Albuquerque	do	19	11
N.Y.	Dutchess Community College, Poughkeepsie**	do	21	6
	New York University, New York	do	32	35
	State University of New York Urban Center, Buffalo	do	30	17
N.C.	Central Piedmont Community College, Charlotte	do	29	22
	Technical Institute of Alamance, Burlington	do	18	13
	University of North Carolina, Chapel Hill	do	21	20
	Wayne Community College, Goldsboro	do	12	16
Ohio	Jane Addams Vocational High School, Cleveland	do	21	21
Oreg.	Blue Mountain Community College, Pendleton	do	15	4
	Lane Community College, Eugene	do	25	21
	Oregon Technical Institute, Klamath Falls**	do	37	11
	Portland Community College, Portland	do	55	38
	Salem Technical Vocational Community College	do	24	13
Pa.	Murrell Dobbins Technical School, Philadelphia	do	38	58
	University of Pittsburgh, Pittsburgh	Private	51	40
S.C.	Greenville Technical Education Center, Greenville	Public	33	13
S. Dak.	Lake Area Vocational Technical School, Watertown	do	17	14
Tenn.	Chattanooga Center for Continuing Education	do	17	12
Tex.	El Centro College, Dallas**	do	29	(2)
	San Antonio College, San Antonio**	do	55	(2)

See footnotes at end of table.

Table 41. LOCATION AND OWNERSHIP OF INSTITUTIONS OFFERING DENTAL ASSISTANT TRAINING PROGRAMS AND NUMBERS OF STUDENTS AND GRADUATES: 1967—Continued

State	School	Ownership	Students (1967–68)	Graduates (1967)
Utah	Intermountain Indian School Health Center, Brigham City.	Public	12	8
	Utah Technical College, Provo	do	33	27
Wash	Bellingham Technical School, Bellingham	do	20	17
	Olympia Vocational Technical Institute, Olympia	do	14	14
	Seattle Community College, Seattle	do	20	18
	Spokane Community College, Spokane	do	18	17
	Tacoma Vocational-Technical Institute, Tacoma	do	34	31
Wis	Coleman Technical Institute, La Crosse	do	23	20
	Green Bay Vocational, Technical and Adult School, Green Bay.	do	17	15
	Madison Vocational, Technical and Adult School, Madison.	do	38	29
	Milwaukee Institute of Technology, Milwaukee	do	48	22
P.R	University of Puerto Rico, San Juan	do	30	22

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[1] A total of 107 programs are offered in the 101 institutions. Institutions providing a 2-year program are only designated with a double asterisk (**); those schools offering both 2-year and 1-year programs are designated with a single asterisk (*). Other listed schools, with no special designation, offer only a 1-year program.

[2] 1st graduating class in 1968.

Source: Council on Dental Education: *Annual Report on Dental Auxiliary Education, 1967–68.* American Dental Association, Chicago, June 1968.

Table 42. LOCATION AND OWNERSHIP OF INSTITUTIONS OFFERING TRAINING PROGRAMS FOR DENTAL LABORATORY TECHNICIANS, AND NUMBERS OF STUDENTS AND GRADUATES: 1967

Location	Institution	Ownership	Students (1967–68)	Graduates (1967)
	Total, 15 institutions		729	162
Calif	University of California Extension Dental Program, Los Angeles.	Public	81	35
	City College of San Francisco, San Francisco	do	41	10
	Los Angeles City College, Los Angeles	do	115	14
	Diablo Valley College, Pleasant Hill	do	33	(1)
Fla	Lindsey Hopkins Education Center, Miami	do	28	12
	Palm Beach Junior College, Lake Worth	do	30	(1)
Ga	The Atlanta Technical School, Atlanta	do	31	12
Ill	Southern Illinois University, Vocational Technical Institute, Carbondale.	do	48	16
Ky	University of Kentucky Program in Dental Technology, Lexington.	do	17	5
Mich	Ferris State College, Big Rapids	do	44	(1)
N.Y	New York City Community College of the City University of New York, Brooklyn.	do	101	40
N.C	Durham Technical Institute, Durham	do	43	12
Oreg	Portland Community College, Portland	do	39	6
Tex	James Connally Technical Institute, Waco	do	58	(1)
Wis	Milwaukee Institute of Technology, Milwaukee	do	20	(1)

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[1] 1st graduating class in 1969.

Source: Council on Dental Education: *Annual Report on Dental Auxiliary Education, 1967–68.* American Dental Association, Chicago, June 1968.

CHAPTER 9

Dietetic and Nutritional Services

Dietetic and nutritional services deal with the application of the scientific principles of nutrition to the feeding of individuals and groups. *Dietitians* assume major responsibility for food selection, preparation, and management of food services. *Nutritionists* engage in investigating and solving problems of nutrition for the promotion of health.

Together, the number of *dietitians* and *nutritionists* employed in 1967 was probably in excess of 30,000—the same as that estimated for 1965. The decennial censuses had reported 22,000 persons so employed in 1950 and 26,000 in 1960 (table 43). The great majority of these persons are dietitians; about 1,000 are nutritionists. The location and type of employment of the members of the American Dietetic Association are shown in tables 44 and 45.

For both groups, the college major is generally home economics, with special emphasis on foods and nutrition and/or institution management. This education can be obtained in the home economics departments of about 400 colleges and universities. In 1965–66, 5,724 persons were awarded baccalaureates in home economics, 660 of which were for majors in foods and nutrition and 251 in institution management or administration. There were 22 bachelor's degrees in nutrition from colleges and universities with departments of nutrition and/or biochemistry (tables 46 and 47).

Education or work experience leads to the differentiation between the two professions, as discussed in the sections that follow.

Dietitians

Dietitians plan and direct food service programs in hospitals, schools, restaurants, and other public or private institutions. Their work includes planning menus and diets that meet nutritional requirements for health or medical treatment, directing the personnel who prepare and serve the meals, managing purchases and accounts, and providing guidance on the application of principles of nutrition to the selection of food.

Close to 13,000 of the employed dietitians work in hospitals and related institutions, although increasing numbers are finding employment in educational institutions, health agencies, industrial plants, and commercial eating places. The American Dietetic Association (ADA), reporting on the 19,660 members in 1967, indicated that 7,165 were not working—generally, retired persons and homemakers not seeking work. Of the 12,495 employed ADA members, 64 percent were administrative and therapeutic dietitians in hospitals and clinics; 8 percent each were in college and school food service; 12 percent were consultant, research, or teaching dietitians; 6 percent were public health, research, or teaching nutritionists; and 10 percent were employed in miscellaneous activities, were full time graduate students, or did not report (table 44).

Five types of dietitians are recognized; the most numerous being *administrative dietitians* directly concerned with food service programs. The director of the department of dietetics in hospitals, schools and universities, industry, and commercial food services may have qualified dietitians to assist in operating these large services. *Therapeutic dietitians* employed by hospitals formulate modified diets prescribed by the physician and instruct patients and their families on how to meet their special food needs. The *dietary consultant* advises on food service practices and facilities and on nutritional problems in group feeding for child care centers, hospitals, nursing homes, schools, and other establishments. The *teaching dietitian* conducts educational programs in dietetics, nutrition, and institution management for dietetic interns, nursing students, and other personnel. Any of these specialists may engage in research pertaining to dietetics; for example, as part of a clinical research study involving the patient, physician, and other health workers in a medical center.

For qualification as a professional dietitian, the American Dietetic Association recommends the completion of an approved dietetic internship or 3 years of experience meeting established standards.

In 1966, 734 graduates of accredited colleges and universities in the United States, Puerto Rico, and other countries were enrolled in dietetic internship programs approved by the ADA (table 48). Of the 64 internship programs approved that year, 57 were for hospitals, two for colleges and universities, three for business and industry, and one each for food clinics and State institutions (table 49).

Some dietitians take graduate courses leading to a master's or doctor's degree. Statistics from the Office of Education show that 132 persons received advanced degrees in foods and nutrition, 24 in institution management or administration from departments of home economics, and 142 in nutrition from departments of nutrition or biochemistry in 1966 (tables 46 and 47).

Membership in the American Dietetic Association serves as a high standard of qualification in the profession, in lieu of certification or a license.

Nutritionists

Nutritionists plan and conduct programs concerning food in relation to health. Their work includes interpreting and evaluating food and nutrition information for acceptance and use by individuals and groups.

Three types of nutritionists are recognized. *Public health nutritionists* are responsible for the nutrition component of health programs, providing consultation and education for professional workers, and participating in research studies. *Teaching nutritionists* conduct educational programs in nutrition for the preparation of professional workers as well as for the public. In colleges they train nutrition personnel, in the Federal Extension Service they advise agency administrators and county home economists, and in business they give technical advice in connection with consumer education programs. *Research nutritionists* are concerned with the interrelationship of nutrients in food and their effects on health.

Preparation for nutritionist positions usually requires academic training at both the undergraduate and graduate levels (tables 46 and 47). For qualification as a public health nutritionist, the American Public Health Association recommends an advanced degree in nutrition. In 1967, 13 schools offered graduate programs in public health nutrition, the majority of which were in schools of public health (tables 50 and 51).

Nutrition workers are found in many professional societies, in addition to The American Dietetic Association. Over 1,000 research scientists who are actively concerned with the chemistry, physiology, or some other aspect of nutrition belong to the American Institute of Nutrition. Nutritionists are largely found within three sections of the American Home Economics Association—Health and Welfare section, 849 members; Food and Nutrition section, 3,715; and Institution Administration section, 606. Many public health nutritionists, food technologists, nutrition educators, and other interested persons belong to the Food and Nutrition section of the American Public Health Association.

Other Food Service Staff

The food service staff in hospitals and other health-related institutions, colleges, and other educational institutions, and restaurants and other commercial institutions may include *dietary technicians, dietary aides, food service supervisors*, and clerical workers in addition to service workers. The *dietary technician,* also identified as the food service manager or technician, assists the dietitian rather than being directly involved in the food service area. The *food service supervisor's* specific duties include supervision of employees and of food service areas—depending on the size of the dietary department of the institution and the way in which it is organized. There were approximately 6,000 food service managers employed in 1967. *Food service clerical workers,* with basic stenographic and clerical skills, assist the dietitian with the paperwork of the dietary department. *Food service workers* have a wide range of jobs in food storing, preparing, cooking and serving, and in cleaning the dishes and kitchen.

Courses are offered by schools to prepare high school students and adults for food service employment. As a part of these courses students spend a number of hours in on-the-job training. Post high school programs to prepare for supervisory positions are offered by a number of vocational schools, technical institutes, and community colleges. In addition, these schools as well as health departments, higher institutions of learning, and hospitals offer short-term training institutes to bring persons currently employed in food service up to date.

A correspondence course conducted by the American Dietetic Association has trained 770 food service supervisors since 1960; as many as 317 students were enrolled in 1967. The number of persons employed as members of food service staffs is not known.

Table 43. LOCATION OF DIETITIANS AND NUTRITIONISTS IN RELATION TO POPULATION: APRIL 1, 1960

Location	Number employed [1]	Rate per 100,000 population
United States	26, 119	14. 6
Alabama	505	15. 5
Alaska	19	8. 4
Arizona	89	6. 8
Arkansas	251	14. 1
California	1, 761	11. 2
Colorado	330	18. 8
Connecticut	485	19. 1
Delaware	74	16. 6
District of Columbia	237	31. 0
Florida	703	14. 2
Georgia	799	20. 3
Hawaii	66	10. 4
Idaho	71	10. 6
Illinois	1, 446	14. 3
Indiana	451	9. 7
Iowa	265	9. 6
Kansas	405	18. 6
Kentucky	342	11. 3
Louisiana	459	14. 1
Maine	103	10. 6
Maryland	448	14. 4
Massachusetts	1, 149	22. 3
Michigan	1, 020	13. 0
Minnesota	434	12. 7
Mississippi	326	15. 0
Missouri	539	12. 5
Montana	62	9. 2
Nebraska	162	11. 5
Nevada	38	13. 3
New Hampshire	93	15. 3
New Jersey	708	11. 7
New Mexico	117	12. 3
New York	3, 461	20. 6
North Carolina	935	20. 5
North Dakota	66	10. 4
Ohio	1, 379	14. 2
Oklahoma	252	10. 8
Oregon	171	9. 7
Pennsylvania	1, 597	14. 1
Rhode Island	162	18. 9
South Carolina	399	16. 7
South Dakota	56	8. 2
Tennessee	607	17. 0
Texas	1, 216	12. 7
Utah	56	6. 3
Vermont	46	11. 8
Virginia	658	16. 6
Washington	427	15. 0
West Virginia	173	9. 3
Wisconsin	469	11. 9
Wyoming	32	9. 7

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[1] As reported in the 1960 Census of Population.

Source: Prindle, R. A., and Pennell, M. Y.: Industry and occupation data from the 1960 census, by State. *Health Manpower Source Book 17*. PHS Pub. No. 263, Section 17. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1963.

Table 44. TYPE OF EMPLOYMENT OF MEMBERS OF THE AMERICAN DIETETIC ASSOCIATION: SELECTED YEARS, 1965 AND 1967

Item	1965		1967	
	Number	*Percent*	*Number*	*Percent*
Total membership	18, 401		19, 660	
Employment status:				
Unemployed	6, 035		7, 165	
Employed	12, 366	100	12, 495	100
Dietitians:				
Hospitals and clinics	7, 541	61	8, 047	64
College and school food service	930	8	1, 022	8
Consultant, research, and teaching	1, 605	13	1, 526	12
Full-time graduate students [1]	160	1	165	1
Miscellaneous activities [2]	1, 108	9	824	7
Nutritionists	698	6	695	6
No report	324	2	216	2

[1] On stipend.

[2] Includes restaurant and commercial business.

Source: American Dietetic Association.

Table 45. LOCATION OF MEMBERS OF THE AMERICAN DIETETIC ASSOCIATION: NOVEMBER 1967

Location	Total employed ADA members	Dietitians			Nutritionists
		Hospitals and clinics	College and school food service	Consultant, research, and teaching	
All locations	[1] 12, 495	8, 047	1, 022	1, 526	695
United States	12, 006	7, 750	1, 007	1, 432	673
Alabama	151	94	11	30	4
Alaska	21	14	2	1	1
Arizona	102	64	4	17	14
Arkansas	66	33	5	16	4
California	1, 394	905	109	187	63
Colorado	254	169	23	30	9
Connecticut	220	140	39	16	10
Delaware	43	20	10	4	2
District of Columbia	161	80	7	25	27
Florida	320	179	38	37	28
Georgia	157	102	17	12	14
Hawaii	67	44	4	5	4
Idaho	39	20	3	12	4
Illinois	779	500	51	89	42
Indiana	261	152	37	37	13
Iowa	198	127	20	36	3
Kansas	173	117	16	23	4
Kentucky	139	92	11	18	12

See footnotes at end of table.

Table 45. LOCATION OF MEMBERS OF THE AMERICAN DIETETIC ASSOCIATION: NOVEMBER 1967—Continued

Location	Total employed ADA members	Dietitians			Nutritionists
		Hospitals and clinics	College and school food service	Consultant, research, and teaching	
Louisiana	172	100	39	19	10
Maine	31	19	3	6	2
Maryland	288	178	21	42	22
Massachusetts	439	291	31	40	26
Michigan	487	320	26	52	32
Minnesota	324	236	13	43	15
Mississippi	76	54	4	11	2
Missouri	265	204	12	19	13
Montana	47	24	4	8	5
Nebraska	117	79	9	18	3
Nevada	22	14	—	2	2
New Hampshire	42	31	3	—	5
New Jersey	280	169	21	26	20
New Mexico	56	33	1	8	6
New York	962	595	66	114	82
North Carolina	191	117	22	20	13
North Dakota	44	28	3	11	1
Ohio	713	487	48	74	19
Oklahoma	152	92	21	23	7
Oregon	150	90	17	22	6
Pennsylvania	643	441	58	52	22
Rhode Island	68	46	2	10	5
South Carolina	62	46	1	4	5
South Dakota	54	39	4	9	2
Tennessee	190	125	9	25	17
Texas	519	339	63	57	18
Utah	77	59	3	11	2
Vermont	34	21	1	7	2
Virginia	239	134	22	28	22
Washington	296	188	43	36	7
West Virginia	61	45	1	8	4
Wisconsin	338	240	28	28	17
Wyoming	22	14	1	4	1
Puerto Rico	91	57	4	13	9
Canal Zone	7	6	1	—	—
Guam	—	—	—	—	—
Virgin Islands	4	3	—	—	2
Armed Forces overseas	84	61	—	11	1
Canada	173	112	4	36	6
Foreign areas	130	58	6	34	4

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[1] Includes 165 full time graduate students, 824 in miscellaneous activities, and 216 who did not report. An additional 7,165 members were unemployed.

Source: American Dietetic Association.

Table 46. EARNED DEGREES CONFERRED IN FOODS AND NUTRITION, INSTITUTION MANAGEMENT OR ADMINISTRATION, AND NUTRITION: 1960–61 THROUGH 1965–66

Academic year	Bachelor's	First professional [1]	Master's	Doctor's
Foods and nutrition (home economics)				
1965–66	660	—	118	14
1964–65	645	—	115	16
1963–64	690	—	123	10
1962–63	620	—	105	13
1961–62	545	—	87	12
1960–61	534	—	118	7
Institution management or administration (home economics)				
1965–66	251	—	24	—
1964–65	205	—	29	—
1963–64	158	—	14	—
1962–63	125	—	14	—
1961–62	148	—	18	—
1960–61	161	—	16	1
Nutrition (biological sciences)				
1965–66	22	—	116	26
1964–65	33	29	62	21
1963–64	23	—	44	14
1962–63	5	—	34	5
1961–62	6	—	19	2
1960–61 [2]	—	—	—	—

[1] Not applicable to Foods and Nutrition nor to Institution Management or Administration.

[2] Data not reported separately.

Source: National Center for Educational Statistics: *Summary Report on Bachelor's and Higher Degrees Conferred During the Year 1965–66*. OE 54013A-66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968. Also prior annual issues. Data for United States, Canal Zone, Puerto Rico, and the Virgin Islands.

Table 47. LOCATION OF SCHOOLS CONFERRING EARNED DEGREES IN FOODS AND NUTRITION, INSTITUTION MANAGEMENT AND ADMINISTRATION, AND NUTRITION, AND NUMBERS OF GRADUATES BY LEVEL OF DEGREE: 1965–66

Location	School	Foods and nutrition			Institution management and administration		Nutrition		
		Bachelor's	Master's	Doctor's	Bachelor's	Master's	Bachelor's	Master's	Doctor's
	Total, all schools	660	118	14	251	24	22	116	26
	Selected schools	629	118	14	246	24	20	116	26
Ala.	Auburn University, Auburn	8	3	—	—	—	—	—	—
	Tuskegee Institute, Tuskegee Institute	—	2	—	19	—	—	—	—
	University of Alabama, University	2	3	—	—	—	1	—	—
Ariz.	University of Arizona, Tucson	5	—	—	—	—	—	—	—
Ark.	A. & M. and Normal College, Pine Bluff	7	—	—	—	—	—	—	—
Calif.	California State College, Los Angeles	—	—	—	15	—	—	—	—
	Immaculate Heart College, Los Angeles	6	—	—	—	—	—	—	—
	Loma Linda University, Loma Linda	—	7	—	—	—	—	—	—
	Pacific Union College, Angwin	3	—	—	—	—	—	—	—
	University of California, Berkeley	9	—	—	—	—	3	9	2
	University of California, Davis	7	—	—	—	—	1	5	2
	University of California, Los Angeles	—	—	—	—	—	—	1	—
Colo.	Colorado State University, Fort Collins	19	1	—	—	—	—	—	—
Conn.	University of Connecticut, Storrs	7	—	—	—	—	—	—	—
Del.	University of Delaware, Newark	5	1	—	—	—	—	—	—
D.C.	Howard University, Washington	5	1	—	—	—	—	—	—
Fla.	Florida A. & M. University, Tallahassee	5	—	—	—	—	—	—	—
	Florida State University, Tallahassee	1	4	1	—	—	6	—	—
Ga.	Berry College, Mount Berry	—	—	—	5	—	—	—	—
	University of Georgia, Athens	4	1	1	2	—	—	—	—
Hawaii	University of Hawaii, Honolulu	3	1	—	5	—	—	—	—
Ill.	Rosary College, River Forest	7	—	—	—	—	—	—	—
Ind.	Purdue University, Lafayette	17	6	3	6	2	—	—	—
Iowa	Clarke College, Dubuque	4	—	—	—	—	—	—	—
	Iowa State University, Ames	27	10	—	6	4	—	—	—
	University of Iowa, Iowa City	—	—	—	—	—	—	8	1
Kans.	Kansas State University Agriculture and Applied Science, Manhattan.	4	4	1	9	8	—	—	—
	University of Kansas, Lawrence	—	—	—	—	—	—	2	—
Ky.	University of Kentucky, Lexington	3	—	—	2	2	—	—	—
La.	Grambling College, Grambling	—	—	—	6	—	—	—	—
	Louisiana State University and A. & M. College, Baton Rouge.	3	—	—	3	—	—	—	—
	St. Mary's Dominican College, New Orleans.	4	—	—	—	—	—	—	—
	Southern University and A. & M. College, Baton Rouge.	22	—	—	4	—	—	—	—
Md.	University of Maryland, College Park	5	1	—	9	—	—	—	—
Mass.	Massachusetts Institute of Technology, Cambridge.	—	—	—	—	—	—	22	7
	Simmons College, Boston	—	—	—	7	—	—	—	—
	State College at Framingham, Framingham.	30	—	—	—	—	—	—	—
Mich.	Andrews University, Barrien Springs	4	—	—	—	—	—	—	—
	Marygrove College, Detroit	4	—	—	—	—	—	—	—
	Michigan State University, East Lansing	21	4	1	—	7	—	—	—

Table 47. LOCATION OF SCHOOLS CONFERRING EARNED DEGREES IN FOODS AND NUTRITION, INSTITUTION MANAGEMENT AND ADMINISTRATION, AND NUTRITION, AND NUMBERS OF GRADUATES BY LEVEL OF DEGREE: 1965–66—Continued

Location	School	Foods and nutrition			Institution management and administration		Nutrition		
		Bachelor's	Master's	Doctor's	Bachelor's	Master's	Bachelor's	Master's	Doctor's
Minn.	College of St. Teresa, Winona	3	—	—	—	—	—	—	—
	University of Minnesota, Minneapolis	19	—	—	—	—	—	—	—
Miss.	Mississippi State College for Women, Columbus.	6	—	—	—	—	—	—	—
	University of Southern Mississippi, Hattiesburg.	1	—	—	4	—	—	—	—
Mo.	Central Missouri State College, Warrensburg.	3	—	—	—	—	—	—	—
	Fontbonne College, St. Louis	9	—	—	—	—	—	—	—
	St. Louis University, St. Louis	—	7	—	—	—	—	—	—
	University of Missouri, Columbia	12	—	—	—	—	—	—	—
Mont.	Montana State University, Bozeman	2	—	—	3	—	—	—	—
Nebr.	University of Nebraska, Lincoln	10	—	—	—	—	—	—	4
N.H.	Mount Saint Mary College, Hooksett	6	—	—	—	—	—	—	—
	University of New Hampshire, Durham	3	—	—	—	—	—	—	—
N.J.	College of St. Elizabeth, Convent Station	9	—	—	—	—	—	—	—
	Rutgers, The State University, New Brunswick.	2	—	—	—	—	—	3	—
N. Mex.	New Mexico State University, University Park.	3	—	—	—	—	—	—	—
N.Y.	CUNY Hunter College, New York	—	5	—	—	—	—	—	—
	Columbia University, New York	—	—	—	—	—	—	23	1
	Cornell University, New York	—	—	—	—	—	—	14	1
	Marymount College, Tarrytown	4	—	—	—	—	—	—	—
	New York University, New York	7	4	—	—	—	—	—	—
	Pratt Institute, Brooklyn	—	—	—	23	—	—	—	—
	Rochester Institute of Technology, Rochester.	—	—	—	14	—	—	—	—
	Russell Sage College, Troy	4	—	—	—	—	—	—	—
	SUNY College of Home Economics at Cornell University, Ithaca.	—	7	—	—	—	—	—	—
	Syracuse University, Syracuse	1	—	—	—	—	8	1	—
N.C.	Agriculture and Technology College of North Carolina, Greensboro.	—	—	—	4	—	—	—	—
	University of North Carolina at Chapel Hill, Chapel Hill.	—	—	—	—	—	—	7	—
	University of North Carolina at Greensboro, Greensboro.	3	—	—	4	—	—	—	—
N. Dak.	North Dakota State University, Fargo	13	—	—	—	—	—	—	—
Ohio	College of Mount St. Joseph of Ohio, Mount St. Joseph.	4	—	—	—	—	—	—	—
	Kent State University, Kent	3	—	—	—	—	—	—	—
	Miami University, Oxford	5	—	—	—	—	—	—	—
	Notre Dame College, Cleveland	3	—	—	—	—	—	—	—
	Ohio State University, Columbus	5	—	—	7	—	—	—	—
	Ohio University, Athens	4	—	—	—	—	—	—	—
	Our Lady of Cincinnati College, Cincinnati.	3	—	—	—	—	—	—	—
	Western Reserve University, Cleveland	—	—	—	—	—	—	7	—

Table 47. LOCATION OF SCHOOLS CONFERRING EARNED DEGREES IN FOODS AND NUTRITION, INSTITUTION MANAGEMENT AND ADMINISTRATION, AND NUTRITION, AND NUMBERS OF GRADUATES BY LEVEL OF DEGREE: 1965–66—Continued

Location	School	Foods and nutrition			Institution management and administration		Nutrition		
		Bachelor's	Master's	Doctor's	Bachelor's	Master's	Bachelor's	Master's	Doctor's
Okla	Oklahoma State University Agriculture and Approved Science, Stillwater.	8	5	—	—	—	—	—	—
Oreg	Oregon State University, Corvallis	4	1	—	10	—	—	—	—
Pa	Carnegie Institute of Technology, Pittsburgh.	4	—	—	—	—	—	—	—
	Drexel Institute of Technology, Philadelphia.	7	10	—	5	—	—	—	—
	Immaculata College, Immaculata	5	—	—	—	—	—	—	—
	Indiana University of Pennsylvania, Indiana.	—	—	—	7	—	—	—	—
	Marywood College, Scranton	12	—	—	—	—	—	—	—
	Pennsylvania State University, University Park.	5	4	—	45	—	—	—	—
	Seton Hill College, Greensburg	3	—	—	—	—	—	—	
	University of Pittsburgh, Pittsburgh	—	—	—	—	—	—	3	1
R.I	Salve Regina College, Newport	4	—	—	—	—	—	—	—
	University of Rhode Island, Kingston	9	—	—	—	—	—	—	—
S.C	South Carolina State College, Orangeburg	3	—	—	—	—	—	—	—
S. Dak	South Dakota State University, Vermillion.	1	1	—	—	—	—	—	—
Tenn	Tennessee Agricultural & Industrial State University, Nashville.	8	—	—	—	—	—	—	—
	University of Tennessee, Knoxville	19	3	—	10	—	1	7	5
Tex	North Texas State University, Denton	7	—	—	—	—	—	—	—
	Prairie View A. & M. College, Prairie View.	17	—	—	—	—	—	—	—
	Texas Southern University, Houston	5	—	—	—	—	—	—	—
	Texas Technological College, Lubbock	13	2	—	—	—	—	—	—
	Texas Woman's University, Denton	5	6	5	—	—	—	—	—
	University of Texas, Austin	13	2	—	2	—	—	—	—
Utah	Brigham Young University, Provo	11	—	—	—	—	—	—	—
	University of Utah, Salt Lake City	7	1	—	—	—	—	—	—
	Utah State University, Logan	4	1	—	—	1	—	4	2
Vt	University of Vermont and State Agricultural College, Burlington.	5	1	—	—	—	—	—	—
Va	Virginia Polytechnic Institute, Blacksburg.	5	2	—	—	—	—	—	—
Wash	University of Washington, Eugene	—	—	—	7	—	—	—	—
	Walla Walla College, College Place	7	—	—	—	—	—	—	—
Wis	Mount Mary College, Milwaukee	6	—	—	—	—	—	—	—
	Stout State University, Menomonie	16	—	—	—	—	—	—	—
	University of Wisconsin, Madison	6	7	2	3	—	—	—	—
P.R	University of Puerto Rico, Rio Piedras	12	—	—	—	—	—	—	—

Source: National Center for Educational Statistics: *Earned Degrees Conferred 1965–66*. OE 54013-66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968.

Table 48. DIETETIC INTERNSHIP PROGRAMS AND INTERNS: SELECTED YEARS, 1951 THROUGH 1967

Year	Programs	Total interns	Interns with bachelor's degrees from		Year	Programs	Total interns	Interns with bachelor's degrees from	
			U.S. schools [1]	Other schools				U.S. schools [1]	Other schools
1967	64	696	666	30	1962	61	645	580	65
1966	[2] 64	734	706	28	1961	63	617	559	58
1965	[2] 63	670	631	39	1960	65	569	510	59
1964	63	670	636	34	1955	69	674	632	42
1963	62	651	592	59	1951	65	687	670	17

[1] Accredited colleges and universities in the United States and Puerto Rico.

[2] Includes Ohio State University program in medical dietetics for undergraduate students.

Sources: Programs—American Hospital Association: *Hospitals*, Guide Issue, Part 2. *J.A.H.A.* 39(15): 404, August 1967. Also prior annual issues.
Interns—American Dietetic Association.
Data for United States and Puerto Rico.

Table 49. LOCATION AND OWNERSHIP OF APPROVED DIETETIC INTERNSHIP PROGRAMS AND NUMBER OF INTERNS: 1966

Location	Program	Ownership	Interns
	Total, 64 programs		[1] 734
	Food clinic internship		
Mass	Frances Stern Food Clinic—Boston Dispensary	Private	6
	Hospital internships		
Ala	Tuskegee Institute, Tuskegee Institute	Public	8
	University of Alabama Hospitals and Clinics, Birmingham	do	8
Calif	Highland Alameda County Hospital, Oakland	do	11
	Letterman General Hospital, San Francisco	do	12
	Loma Linda University, School of Nutrition and Dietetics, Los Angeles.	Private	14
	University of California, School of Public Health, Berkeley	Public	9
	University of California Medical Center, San Francisco	do	13
	Veterans' Administration Center, Los Angeles	do	19
Colo	Colorado State Hospital, Pueblo	do	6
	Fitzsimons General Hospital, Denver	do	12
Conn	Yale-New Haven Hospital, New Haven	Private	14
D.C	Freedman's Hospital, Washington	Public	10
	Walter Reed General Hospital, Washington	do	16
Ga	Emory University Woodruff Medical Center, Atlanta	Private	12
Ill	Cook County Hospital, Chicago	Public	11
	University of Chicago Clinics, Chicago	Private	8
	Veterans' Administration Hospital, Hines	Public	20
Ind	Indiana University Medical Center, Indianapolis	do	14
Iowa	University of Iowa Hospitals, Iowa City	do	12
Kans	University of Kansas Medical Center, Kansas City	do	5
Mass	Beth Israel Hospital, Boston	Private	13
	Massachusetts General Hospital, Boston	do	25
	Peter Brent Brigham Hospital, Boston	do	15

See footnotes at end of table.

Table 49. LOCATION AND OWNERSHIP OF APPROVED DIETETIC INTERNSHIP PROGRAMS AND NUMBER OF INTERNS: 1966—Continued

Location	Program	Ownership	Interns
	Hospital internships		
Mich.	Harper Hospital, Detroit	Private	18
	Henry Ford Hospital, Detroit	do.	17
	University of Michigan Medical Center, Ann Arbor	Public	9
Minn.	St. Paul-Ramsey Hospital	do.	8
	St. Mary's Hospital, Rochester	Private	16
	University of Minnesota Hospitals, Minneapolis	Public	16
Mo.	Barnes Hospital, St. Louis	Private	15
	St. Louis University Hospitals, St. Louis	do.	11
N.Y.	Grasslands Hospital, Valhalla	Public	10
	N.Y. State Dept. of Mental Hygiene (Food Service Administration), Poughkeepsie.	do.	8
	New York Hospital, New York	Private	17
	U.S. Public Health Service Hospital, New York	Public	12
	Veterans' Administration Hospital, New York	do.	11
N.C.	Duke University Medical Center, Durham	Private	12
Ohio	Cincinnati General Hospital, Cincinnati	Public	10
	Good Samaritan Hospital, Cincinnati	Private	18
	Miami Valley Hospital, Dayton	do.	11
	St. Luke's Hospital, Cleveland	do.	11
	University Hospitals of Cleveland, Cleveland	do.	—
	Case Western Reserve University, Coordinated with Mount Sinai Hospital, University Hospital of Cleveland, U.S. Veterans Administration Hospital, Cleveland.	do.	6
	U.S. Veterans' Administration Hospital, Cleveland	Public	5
Okla.	University of Oklahoma Medical Center, Oklahoma City	do.	10
Oreg.	University of Oregon Medical School Hospitals and Clinics, Portland.	do.	10
Pa.	Shadyside Hospital, Pittsburgh	Private	7
P.R.	University (District) Hospital, Rio Piedras	Public	7
Tenn.	Vanderbilt University Hospital, Nashville	Private	12
Tex.	Baylor University Medical Center, Dallas	do.	6
	Brooke General Hospital, Fort Sam Houston	Public	19
	Veterans' Administration Hospital, Houston	do.	16
Utah	Latter-Day Saints Hospital, Salt Lake City	Private	6
Va.	Medical College of Virginia, Richmond	Public	14
Wash.	Seattle Internship for Hospital Dietitians (King County Hospital; Swedish Hospital; Children's Orthopedic Hospital), Seattle.	Public-private	13
Wis.	University Hospitals, University of Wisconsin, Madison	Public	10
	Milwaukee County Institutions, Milwaukee	do.	8
	Business and industry internships		
Conn.	Aetna Life Affiliated Companies, Hartford	Private	6
N.Y.	Eastman Kodak Company, Rochester	do.	10
Ohio	Stouffer Foods Corporation, Cleveland	do.	10
	College and university internships		
Okla.	Oklahoma State University, Stillwater	Public	5
Wash.	University of Washington, Seattle	do.	12
	State institutions and agencies		
Pa.	Institutional Food Research and Services, Pennsylvania State University, University Park.	do.	6

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[1] Includes 13 student interns in the undergraduate program at the Ohio State University.

Source: The American Dietetic Association.

Table 50. LOCATION AND OWNERSHIP OF SCHOOLS OFFERING MASTER'S DEGREES IN PUBLIC HEALTH NUTRITION AND NUMBERS OF STUDENTS AND GRADUATES: 1966–67

Location	School	Ownership	Students	Graduates
	Total, 13 schools		152	84
Calif.	University of California, School of Public Health, Berkeley.	Public	19	13
	University of California, School of Public Health, Los Angeles.	do	41	17
Mass.	Harvard University, School of Public Health, Boston	Private	9	3
	Massachusetts Institute of Technology, Cambridge [1]	do	12	5
Mich.	University of Michigan, School of Public Health, Ann Arbor.	Public	11	8
Minn.	University of Minnesota, School of Public Health, Minneapolis.	do	7	1
N.Y.	Columbia University, School of Public Health, New York.	Private	17	16
	Columbia University Teachers College, New York	do	6	4
	Cornell University, Graduate School of Nutrition, Ithaca.	do	2	1
N.C.	University of North Carolina, School of Public Health, Chapel Hill.	Public	7	7
Ohio	Case Western Reserve University, Department of Nutrition, Cleveland.	Private	11	6
Pa.	Pennsylvania State University, College of Home Economics, University Park.	do	5	—
Tenn.	University of Tennessee, College of Home Economics, Knoxville.	Public	5	3

[1] Degrees are granted in nutrition, biochemistry and metabolism.

Source: Individual schools.

Table 51. SCHOOLS OFFERING MASTER'S DEGREES IN PUBLIC HEALTH NUTRITION AND NUMBERS OF STUDENTS AND GRADUATES: SELECTED YEARS, 1949–50 THROUGH 1966–67

Academic year	Schools	Students	Graduates	Academic year	Schools	Students	Graduates
1966–67	14	155	86	1961–62	12	73	56
1965–66	14	135	70	1960–61	11	44	33
1964–65	14	117	73	1959–60	10	49	40
1963–64	13	116	72	1954–55	10	38	36
1962–63	13	80	46	1949–50	6	37	34

Source: The individual schools.

CHAPTER 10

Economic Research in the Health Field

The major functions of the *health economist*, whether he is or is not formally trained in economics, are to appraise health as an economic asset and to analyze ways in which the provision of health care goods and services affects the health of individuals and hence the well-being of families and nations. Usually health economic research activities are grouped into five broad categories related to health—financing, organization, facilities, utilization, and manpower. Health economic research provides information essential for decision making in both public and private agencies.

In a program setting, the health economist makes his contribution mainly through research and analytical studies rather than through the provision of services. For this reason the field will remain relatively small, in relation to personnel who provide health services, in the foreseeable future. Approximately 500–600 persons were employed as health economists in 1967 according to an estimate provided by the Health Economics Branch, Division of Medical Care Administration, Bureau of Health Services, Public Health Service.

Basic research in health economics is carried out primarily by economists employed in universities and research foundations. Applied research in health economics is frequently the responsibility of the health economist employed by large health-related organizations. Examples of large organizations employing health economists are the Public Health Service and other components of the U.S. Department of Health, Education, and Welfare; State and local health departments; national professional health societies; and voluntary health agencies.

The responsibilities of a health economist who is employed at a university vary depending upon the orientation of the university. A faculty member who teaches health economics is likely to spend more time in teaching other aspects of economics than he devotes to health. Frequently, the university economist combines teaching with research activities and occasional outside consultations. Some faculty members have research appointments only, with no teaching responsibilities; others may have joint teaching appointments both in the university's department of economics or business school and in the school of public health or school of medicine. In organizations other than universities and research foundations, health economists are usually a part of the overall administrative staff with responsibility for conducting specialized studies. They frequently serve as advisers and consultants in program analysis, and in the development of new programs. In these situations the health economist provides information on program costs, value of the program to the economy, and various aspects of supply and demand.

A bachelor's degree with a major in economics is usually required for most beginning jobs in health economics in both government and private industry. A master's degree, and usually a doctorate, is required for career appointments at universities and research foundations.

Information on the number of degrees conferred in economics is given in table 52, and on the institutions conferring these degrees, in table 53. No information is available on degrees with specialization in health economics.

At present, few courses limited to health economics are offered. However, a small number of graduate schools and schools of public health offer such specific courses. At other schools, the subject matter of health economics is taught as part of a more comprehensive course such as economic development, social insurance, investment in human resources, welfare economics, hospital administration, or medical care administration. With the increased interest in health economics, more schools are beginning to attract qualified faculty to offer courses and to do research specific to health economics. It is anticipated that more graduate schools will begin to develop teaching programs geared to the student whose major area of concentration is health economics.

Table 52. EARNED DEGREES CONFERRED IN ECONOMICS: 1960–61 THROUGH 1965–66

Academic year	Bachelor's	1st professional requiring 6 or more years [1]	Master's	Doctor's
1965–66	11, 585	—	1, 528	458
1964–65	10, 875	20	1, 268	410
1963–64	10, 582	25	1, 111	385
1962–63	9, 399	—	1, 029	331
1961–62	8, 387	18	853	268
1960–61	7, 939	—	820	266

[1] For years prior to 1965–66, the requirement was 5 or more years.

Source: National Center for Educational Statistics: *Summary Report on Bachelor's and Higher Degrees Conferred During the Year 1965–66.* OE 54013A–66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968. Also prior annual issues. Data for United States, Canal Zone, Puerto Rico, and the Virgin Islands.

Table 53. LOCATION OF SCHOOLS CONFERRING DEGREES IN ECONOMICS AND NUMBERS OF GRADUATES: 1965–66

Location	School	Graduates		
		Bachelor's	Master's	Doctor's
	Total, all schools	11, 585	1, 528	458
	Selected schools	5, 996	1, 528	458
Ala.	University of Alabama, Tuscaloosa	13	2	—
Ariz.	Arizona State University, Tempe	19	10	—
	University of Arizona, Tucson	13	9	1
Ark.	University of Arkansas, Fayetteville	22	1	1
Calif.	California State College, Los Angeles	25	1	—
	Claremont Graduate School & University Center, Claremont.	—	27	4
	Sacramento State College, Sacramento	23	2	—
	San Diego State College, San Diego	18	4	—
	San Francisco State College, San Francisco	40	1	—
	Stanford University, Stanford	123	19	10
	University of California, Berkeley	137	89	19
	University of California, Davis	28	1	—
	University of California, Los Angeles	110	37	1
	University of California, Riverside	4	2	—
	University of California, Santa Barbara	68	6	—
	University of Southern California, Los Angeles	19	21	11
Colo.	Colorado State University, Fort Collins	7	6	—
	University of Colorado, Boulder	41	7	17
	University of Denver, Denver	35	10	—
Conn.	Southern Connecticut State College, New Haven	—	1	—
	Trinity College, Hartford	32	4	—
	University of Connecticut, Storrs	52	23	1
	Yale University, New Haven	85	54	14
Del.	University of Delaware, Newark	15	6	—
D.C.	American University, Washington	14	16	7
	Catholic University of America, Washington	16	7	2
	George Washington University, Washington	28	24	3
	Georgetown University, Washington	41	14	2
	Howard University, Washington	37	5	—

Table 53. LOCATION OF SCHOOLS CONFERRING DEGREES IN ECONOMICS AND NUMBERS OF GRADUATES: 1965–66—Continued

Location	School	Graduates		
		Bachelor's	Master's	Doctor's
Fla.	Florida State University, Tallahassee	14	10	—
	University of Florida, Gainesville	31	—	5
	University of Miami, Coral Gables	61	4	—
Ga.	Atlanta University, Atlanta	—	2	—
	Emory University, Atlanta	13	2	—
	Georgia State College, Atlanta	13	9	1
	University of Georgia, Athens	18	4	1
Hawaii	University of Hawaii, Honolulu	25	12	—
Ill.	DePaul University, Chicago	14	4	—
	Northern Illinois University, De Kalb	20	3	—
	Northwestern University, Evanston	17	13	3
	Roosevelt University, Chicago	13	2	—
	Southern Illinois University, Carbondale	43	10	1
	University of Illinois, Urbana	81	18	4
	University of Chicago, Chicago	18	38	13
Ind.	Ball State University, Muncie	1	1	—
	Indiana State University, Terre Haute	4	2	—
	Indiana University, Bloomington	45	34	9
	Purdue University, Lafayette	174	13	12
	University of Notre Dame, Notre Dame	61	6	2
Iowa	Drake University, Des Moines	16	11	—
	Iowa State University of Science & Technology, Ames	16	6	4
	University of Iowa, Iowa City	41	7	5
Kans.	Fort Hays Kansas State College, Hays	5	5	—
	Kansas State University Agriculture & Applied Science, Manhattan.	8	12	1
	University of Kansas, Lawrence	25	5	—
	Wichita State University, Wichita	16	2	—
Ky.	University of Kentucky, Lexington	7	4	3
La.	Louisiana State University, Baton Rouge	27	8	1
	Loyola University, New Orleans	4	9	—
	Tulane University of Louisiana, New Orleans	12	1	6
Md.	Johns Hopkins University, Baltimore	11	1	2
	University of Maryland, College Park	84	10	5
Mass.	Boston College, Chestnut Hill	132	6	4
	Boston University, Boston	35	9	1
	Clark University, Worchester	14	4	3
	Harvard University, Cambridge	118	9	33
	Massachusetts Institute of Technology, Cambridge	15	3	15
	Mount Holyoke College, South Hadley	53	1	—
	Tufts University, Medford	25	4	—
	University of Massachusetts, Amherst	39	18	2
	Williams College, Williamstown	33	19	—
Mich.	Michigan State University, East Lansing	43	27	2
	University of Detroit, Detroit	6	7	—
	University of Michigan, Ann Arbor	132	46	12
	Wayne State University, Detroit	31	11	5
	Western Michigan University, Kalamazoo	20	4	—
Minn.	Mankato State College, Mankato	35	1	—
	University of Minnesota, Minneapolis	111	7	12
Miss.	Mississippi State University, State College	3	2	—
	University of Mississippi, University	3	4	1
	University of Southern Mississippi, Hattiesburg	2	3	—

Table 53. LOCATION OF SCHOOLS CONFERRING DEGREES IN ECONOMICS AND NUMBERS OF GRADUATES: 1965–66—Continued

Location	School	Graduates		
		Bachelor's	Master's	Doctor's
Mo	Central Missouri State College, Warrensburg	10	5	—
	St. Louis University, St. Louis	7	6	—
	University of Missouri, Columbia	46	12	2
	University of Missouri, Kansas City	23	3	—
	Washington University, St. Louis	21	6	2
Mont	Montana State University, Bozeman	11	2	—
Nebr	University of Nebraska, Lincoln	19	7	4
Nev	University of Nevada, Reno	11	2	—
N.H	University of New Hampshire, Durham	14	6	—
N.J	Fairleigh Dickinson University, Rutherford	42	11	—
	Princeton University, Princeton	41	8	9
	Rutgers, The State University, New Brunswick	147	9	6
	Seton Hall University, South Orange	18	4	—
N. Mex	University of New Mexico, Albuquerque	11	1	—
N.Y	Columbia University, New York	84	35	17
	Cornell University, Ithaca	79	5	8
	CUNY, Brooklyn College, New York	107	9	—
	CUNY, City College, New York	122	39	—
	CUNY, Hunter College, New York	74	3	—
	CUNY, Queens College, New York	100	1	—
	Fordham University, New York	68	14	4
	Long Island University, Greenvale	24	1	—
	New School for Social Research, New York	1	13	9
	New York University, New York	75	41	10
	Rensselaer Polytechnic Institute, Troy	6	1	—
	St. Johns University, Jamaica	75	6	—
	SUNY, College of Forestry, Syracuse	—	4	3
	SUNY, State University, Buffalo	28	2	—
	Syracuse University, Syracuse	55	7	3
	University of Rochester, Rochester	15	6	2
N.C	Duke University, Durham	43	5	13
	North Carolina State University, Raleigh	35	—	10
	University of North Carolina, Chapel Hill	61	1	4
N. Dak	North Dakota State University, Fargo	62	2	—
	University of North Dakota, Grand Forks	6	1	—
Ohio	Kent State University, Kent	23	5	—
	Oberlin College, Oberlin	22	1	—
	Ohio State University, Columbus	78	14	4
	Ohio University, Athens	11	2	—
	University of Akron, Akron	2	1	—
	University of Cincinnati, Cincinnati	57	9	1
	Western Reserve University, Cleveland	15	1	3
	Xavier University, Cincinnati	53	20	—
Okla	Oklahoma State University, Stillwater	25	2	2
	University of Oklahoma, Norman	29	11	4
Oreg	University of Oregon, Eugene	54	4	1
Pa	Bucknell University, Lewisburg	28	1	—
	Carnegie Institute of Technology, Pittsburgh	—	—	3
	Lehigh University, Bethlehem	23	5	—
	Pennsylvania State University, University Park	26	5	—
	Temple University, Philadelphia	29	6	—
	University of Pennsylvania, Philadelphia	67	37	17
	University of Pittsburgh, Pittsburgh	41	2	6
	University of Scranton, Scranton	12	1	—

Table 53. LOCATION OF SCHOOLS CONFERRING DEGREES IN ECONOMICS AND NUMBERS OF GRADUATES: 1965–66—Continued

Location	School	Graduates		
		Bachelor's	Master's	Doctor's
R.I.	Brown University, Providence	47	5	3
	University of Rhode Island, Kingston	7	1	—
S.C.	University of South Carolina, Columbia	5	4	—
S. Dak.	South Dakota State University, Brookings	40	5	—
Tenn.	East Tennessee State University, Johnson City	7	5	—
	Memphis State University, Memphis	19	7	—
	University of Tennessee, Knoxville	33	2	1
	Vanderbilt University, Nashville	20	25	2
Tex.	Baylor University, Waco	17	7	—
	Hardin Simmons University, Abilene	2	3	—
	North Texas State University, Denton	14	2	—
	Praire View A. & M. College, Praire View	5	2	—
	Southern Methodist University, Dallas	17	1	3
	St. Marys University, San Antonio	25	21	—
	Texas A. & M. University, College Station	24	3	—
	Texas Christian University, Fort Worth	10	6	—
	Texas College Arts Industries, Kingsville	3	2	—
	Texas Technological College, Lubbock	15	9	—
	Texas Woman's University, Denton	9	5	—
	Trinity University, San Antonio	6	2	—
	University of Texas, Austin	60	10	8
	University of Houston, Houston	25	7	—
Utah	Brigham Young University, Provo	42	5	—
	University of Utah, Salt Lake City	33	2	1
	Utah State University, Logan	24	10	—
Vt.	University of Vermont & Stagric College, Burlington	44	2	—
Va.	University of Virginia, Charlottesville	70	2	10
	University of Richmond, Richmond	23	1	—
Wash.	Eastern Washington State College, Cheney	6	1	—
	Gonzaga University, Spokane	11	2	—
	University of Washington, Seattle	94	26	7
	Washington State University, Pullman	17	2	—
W. Va.	West Virginia University, Morgantown	16	2	—
Wis.	Marquette University, Milwaukee	34	4	—
	University of Wisconsin, Madison	146	58	15
Wyo.	University of Wyoming, Laramie	7	4	—
P. R.	University of Puerto Rico, Rio Piedras	30	6	—

Source: National Center for Educational Statistics: *Earned Degrees Conferred 1965–66.* OE–54013–66. Office of Education, U.S. Department of Health Education, and Welfare. Washington. U.S. Government Printing Office, 1968.

CHAPTER 11

Environmental Control*

The Nation's growth and productivity have resulted in many new and complex environmental problems which seriously challenge man's health and well-being. Included are problems related to the pollution of air, water, soil, and food * * * occupational and community stresses * * * noise * * * vibration * * * inadequate housing and work environments * * * hazards on the highways and in the homes * * * radiation and other hazards. Moreover, the current quality of our environment is unacceptable in terms of public health and well-being.

The acute awareness of these problems, and the need for effective approaches to the protection of man from environmental hazards, are evident in the recent reports of the Environmental Pollution Panel of the President's Science Advisory Committee (*15*), the National Academy of Sciences, National Research Council (*16*), and the Task Force on Environmental Health and Related Problems (*17*).

Environmental control problems call for a multidisciplinary approach combining the efforts of engineers, physical and biological scientists, social scientists, physicians, administrators, and technical support personnel. These personnel engage in research and development activities, in teaching, and in the application of knowledge to the prevention and control of environmental hazards. Principal activities include:

1. Detection, analysis, and measurement of environmental hazards;
2. Determining the biological and other effects of environmental hazards;
3. Development of standards and criteria; and
4. Planning and conducting of prevention and control programs.

Environmental engineers, sanitarians, and other specialists may have the assistance of technicians and/or aides. These auxiliary workers assist in making inspections, surveys, investigations, and evaluations of public and private establishments and facilities to determine compliance with public sanitation laws and regulations. They obtain samples of air, food, and water; and assist in performing laboratory and field tests to determine the quality of such samples. They assist in operating water and waste water treatment plants. They also are employed in radiation protection and other environmental programs.

The absence of a comprehensive roster of qualified personnel primarily concerned with environmental protection in the United States was pointed out at a conference on Educational Needs in Environmental Health held in 1962 (*18*). At present, deterrents to the development of a meaningful roster include a lack of understanding of (1) the roles and functions of the various disciplines and (2) the interpretation of occupations in terms of basic discipline versus categorical program specialization. While neither of these factors is peculiar to the field of environmental protection, little progress has been made in developing a better understanding in this rapidly developing and expanding field. There is an urgent need to define more clearly the roles and functions of these disciplines.

Historically, an effort has been made to delineate the manpower situation in two basic environmental disciplines: Environmental engineering and sanitary sciences. Little or no meaningful data are currently available for other basic disciplines. However, it is recognized that the total number of persons employed in environmental control exceeded 35,000 in 1967—an estimate based on 9,000 engineers, 15,000 sanitarians and sanitarian technicians, and approximately 11,000 program specialists.

Environmental Engineer

The *environmental engineer* applies engineering principles to the prevention, control, and management of environmental factors that influence man's physical, mental, and social health and well-being. During the last decade the need for a comprehensive view of all environmental factors and their interrelationships has broadened the opportunities for engineers. Prior to that time, the engineer was primarily concerned with such factors as water supply and water pollution, and thus the use of the occupational title "sanitary engineer" was not inappropriate. The more comprehensive outlook validates the title of "environmental engineer."

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*This chapter was prepared by the Public Health Service, Bureau of Consumer Protection and Environmental Health Service, Mr. Ralph C. Graber, Liaison to the Bureau of Health Manpower.

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According to the latest estimates, an estimated 8,000 to 9,000 environmental engineers were employed in this country in 1965. An earlier survey indicated about 5,000 practicing sanitary engineers in 1950 (*19*).

In 1956, the National Science Foundation and the Public Health Service cooperated in developing the sanitary engineer portion of the National Register of Scientific and Technical Personnel (*20*). The survey was repeated biennially until 1964 when the Register was expanded to a more representative cross section of the entire engineering profession (*21*).

Characteristics of the survey respondents in 1962 are presented in table 54. About one-third of the engineers were employed by State and local governments, one-third by private industry and business, and the balance by the Federal Government and other organizations. Management or administration was the most important function, with nearly one-third of the respondents engaged in that activity. More than one-half of those surveyed had a bachelor's degree; another third, a master's degree.

There are a number of professional organizations concerned with the field of environmental engineering. Seven of these organizations (*22*) have joined in sponsoring the Environmental Engineering Intersociety Board, Inc. (formerly the American Sanitary Engineering Intersociety Board, Inc.). The objectives of the Board are to improve the practice, elevate the standards, and advance the cause of environmental engineering. Certification as a diplomate of the American Academy of Environmental Engineers (AAEE) is awarded by the Board, based upon compliance with educational and experience standards, State licensure, and satisfactory completion of a written examination. Currently, the Board certifies environmental engineers in four subspecialties: air pollution control, industrial hygiene, radiation and hazard control, and sanitary engineering. The AAEE Roster of 1967 lists about 1,100 persons in the United States.

All States require licensing of professional engineers. The educational and experience requirements for licensure vary.

Sanitarian

The *sanitarian* applies his knowledge of the principles of the physical and biological sciences to the prevention, control, and management of man's environment in one or more areas of environmental sanitation.

According to the most recent figures available, an estimated 15,000 sanitarians and sanitarian technicians combined were employed in 1965. Prior estimates by the Public Health Service had indicated about 5,000 in 1950 and 11,000 in 1960.

The first national survey of persons who regarded themselves as sanitarians was conducted in 1962. State and county governments were the major employers. Inspection, testing, and control were the major activities of half of those answering the survey questionnaire. Two-thirds indicated a specialization in milk, food, and meat technology (table 55).

The following 31 States are known to require the registration or licensing of sanitarians: Alabama, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Kentucky, Louisiana, Massachusetts, Michigan, Montana, Nebraska, Nevada, New Jersey, New Mexico, North Carolina, Oklahoma, Oregon, South Carolina, South Dakota, Tennessee, Texas, Utah, Washington, West Virginia, and Wisconsin.

In 1960, a model registration act was developed by the Sanitarians Joint Council which is made up of the International Association of Milk, Food and Environmental Sanitarians (3,000 members), and the National Association of Sanitarians (6,000 members), along with the American Public Health Association. The minimum requirements for qualification as a sanitarian are: (1) a bachelor's degree with a minimum of 30 semester hours of academic work in environmental health or in the physical and biological sciences, (2) employment full-time as a sanitarian for not less than 2 years, and (3) successful completion of an examination given and conducted by the State registration board. Membership in the National Association of Sanitarians requires meeting similar standards; however, a special membership category is being established for nondegree personnel.

An American Intersociety Board of Certification of Sanitarians which was organized in October 1964 by the Sanitarians Joint Council provides recognition of professional achievement.

Program Specialist

Environmental protection specialists may practice their basic discipline per se or acquire a categorical program specialization beyond their disciplinary specialization. In either case, these specialists can contribute more effectively if they are able to comprehend the interdisciplinary demands of environmental problems and if they have the ability to communicate and work with the other specialists in the field.

Three examples of categorical program specialists are discussed below:

1. *Industrial hygienists* conduct health programs in industrial plants or similar organizations, to eliminate or control occupational health hazards and diseases. They are concerned with four categories of stresses: (1) chemical stresses such as dust or gas, (2) physical stresses such as radiation or noise, (3) biological factors including insects and fungi, and (4) ergonomic items such as monotony and work pressure.

The industrial hygienist may make direct measurements of the industrial environment, evaluate the degree of exposure to the contaminant or stress, and recommend or design control measures. He may work with industrial physicians to institute nonengineering measures for control and correction of hazards. The occupational health programs in large organizations may also be staffed with chemists, toxicologists, physicists, nurses, and laboratory personnel. Data are available for the staffing of State and local governmental units (table 56).

The latest estimate available indicates that nearly 2,300 industrial hygienists were employed in the United States in 1965. This represents a fourfold increase since 1950. Most of them work in an industrial setting, but increasing numbers are being employed by transportation companies, public utilities, mining operations, insurance companies, universities, and health and labor departments.

The major professional associations concerned with industrial hygiene are the American Industrial Hygiene Association (1,500 members) and the American Conference of Governmental Industrial Hygienists (1,000 members).

2. *Radiation protection personnel* at the professional level include health physicists and other scientists with special training in the health aspects of radiation. The radiation exposure problems with which they are concerned are associated with the use of X-ray machines, radioactive materials, nuclear reactors, and particle accelerators, as well as environmental radioactive contamination. Their work is conducted principally in industrial, medical, research, or educational institutions that use radiation sources and in health agencies that have responsibility for protection of the public health. *Health technicians* trained in radiation monitoring or other supportive services constitute an important radiological protection role.

Approximately 4,600 radiation protection personnel were employed in 1966 (table 57). They are divided almost equally between professional and technical workers.

Several professional associations and societies serving radiation protection objectives provide opportunity for membership, such as the Health Physics Society, the American Public Health Association, and the American College of Radiology. The first two of these serve as sponsors of the American Board of Health Physics, an organization established in 1959 to improve the practice and elevate the standards of health physics. Through a system of written and oral examinations, by 1967 the Board had certified almost 500 people as professionally qualified to assume higher level positions in health physics. Requirements for certification include (a) graduation with a bachelor's degree in a physical science, or a biological science with a minor in physical sciences, and (b) 6 years of responsible professional experience in health physics.

3. *Air pollution control personnel* include chemical and mechanical engineers, chemists, meteorologists, statisticians, biological scien-

tists, sanitarians, technicians, and inspectors. The principal activities which comprise air pollution control programs are: (a) identification and measurement of chemical pollutants and airborne particulate matter within the atmosphere, (b) measurement and analysis of the effects of meteorological variables on atmospheric pollution conditions, (c) determination of the effects of air pollution on biological systems and inorganic materials, (d) the control of sources of air pollution including industrial production processes, combustion and space heating equipment, and vehicular sources, (e) the development, installation, and operation of a variety of processes and equipment designed to reduce or eliminate the emission of air pollutants, (f) the development and enforcement of air quality and emission standards, (g) the coordination and integration of air pollution control efforts with other environmental health activities and with diverse industrial and governmental programs and agencies conducting activities which affect, directly or indirectly, the quality of the air.

There are presently about 1,080 professional and 690 technical personnel employed in State and local governmental air pollution control programs (table 58). There are also approximately 500 full-time professionals employed in the Federal air pollution control program. No statistics on the number of personnel employed by industry for air pollution control activities are available, but it is probable that the number exceeds Federal, State, and local personnel combined.

The Air Pollution Control Association is the major professional society concerned with air pollution. Other societies such as the American Society of Civil Engineers, American Society of Mechanical Engineers, and the American Public Health Association also have major committees and activities related to air pollution.

Education and Training

The minimum educational requirement for environmental engineers, sanitarians, and other specialists is the baccalaureate degree. However, the trend is towards a requirement of graduate education in one of the basic disciplines or in an area of categorical program specialization. In several basic disciplines the qualifying professional degree is the doctorate.

A number of graduate educational programs in environmental protection are supported by several Federal agencies (table 59). In 1967, stipend support for full-time, long-term training, including research training, was provided for some 664 engineers, 52 sanitarians, and 855 environmental specialists. These totals include Public Health Service stipend support for some 350 engineers, 52 sanitarians, and 698 specialists in 1967 (table 60).

The usual undergraduate curriculum of the *environmental engineer* is in chemical, civil, electrical, or mechanical engineering. The number of graduate degrees awarded in environmental engineering is shown in table 61.

The minimum educational requirement for the *environmental technologist* or *sanitarian* is a baccalaureate with a major in environmental health or in the physical or biological sciences. Approximately 150 persons graduate annually with majors in environmental health. Presently, 30 academic institutions offer undergraduate 4-year programs in environmental health (table 62).

During 1968, the National Association of Sanitarians will initiate an accreditation program for undergraduate environmental health (or related) curricula, including those offered by junior colleges.

The minimum educational requirement for the *sanitarian technician* is an associate degree in environmental health, radiologic technology, or related areas of specialization. A number of junior colleges or technical institutes offer technical training in environmental health or similar areas.

The *environmental aide* normally is a high school graduate with varying amounts of appropriate short-course training in specialized subjects.

A wide variety of short technical courses for environmental engineers, sanitarians, and other specialists are offered by the Public Health Service at the following locations:

(1) National Center for Urban and Industrial Health, Cincinnati, Ohio (offering courses in occupational health, solid wastes, food protection, computational analysis, and—beginning in fiscal year 1968—water supply and injury control); (2) National Center for Air Pollution

Control, Durham, N.C.; and (3) National Center for Radiological Health (offering courses at the following radiological health installations: Training Branch, Rockville, Md.; Southwestern Laboratory, Las Vegas, Nev.; Southeast Laboratory, Montgomery, Ala.; and Northeast Laboratory, Winchester, Mass.).

In addition, short courses are conducted at other PHS field stations and selected locations in the States in response to requested field presentations. During fiscal year 1967, over 4,000 persons attended these courses. The number enrolled in each training activity was as follows: 1,530, in air pollution; 1,267, in radiological health; 693, in food protection; 454, in occupational health; 148, in solid wastes; and 113, in computational analysis.

Courses in water pollution control formerly given by the Public Health Service, are now being conducted by the Federal Water Pollution Administration, Department of the Interior. Short technical courses for continuing education are also offered by several other Federal agencies as well as by non-Federal institutions.

REFERENCES

(*15*) Report of the Environmental Pollution Panel, President's Science Advisory Committee: *Restoring the Quality of Our Environment.* Washington. U.S. Government Printing Office, 1965.

(*16*) National Research Council: *Waste Management and Control.* National Research Council Pub. No. 1400. Washington, D.C. National Academy of Sciences, 1966.

(*17*) A Report to the Secretary of Health, Education, and Welfare by the Task Force on Environmental Health and Related Problems: *A Strategy for a Livable Environment.* Washington. U.S. Government Printing Office, June 1967.

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(*19*) Lyon, W. A., and Miller, A. P.: The composition of the sanitary engineering profession (1950). *Scientific Manpower Series 2.* National Scientific Register. Office of Education, Federal Security Agency. Washington. U.S. Government Printing Office, 1952.

(*20*) Butrico, F. A., and Light, I.: *Sanitary Engineering Manpower (1956–57).* PHS Pub. No. 703. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1959.

(*21*) Engineers Joint Council: *Engineering Manpower in Profile (1964). A Report from the National Engineers Register.* New York, 1965.

(*22*) The seven are: Air Pollution Control Association, American Institute of Chemical Engineers, American Public Health Association, American Society for Engineering Education, American Society of Civil Engineers, American Water Works Association, and Water Pollution Control Federation.

Table 54. TYPE OF EMPLOYER, WORK ACTIVITY, AND HIGHEST ACADEMIC DEGREE OF SANITARY ENGINEER SURVEY RESPONDENTS: 1962

Item	Number	Percent
Type of employer		
Total	[1] 4,923	100.0
Educational institution	362	7.4
Military and Public Health Service	366	7.4
Other Federal Government	296	6.0
State and local government	1,644	33.4
Nonprofit organization	36	0.7
Industry and business	1,622	32.9
Self-employed	431	8.8
Other	77	1.6
No report	89	1.8
Work activity		
Total	4,923	100.0
Research, development, or design	812	16.5
Management or administration	1,421	28.9
Teaching	247	5.0
Production and inspection	737	15.0
Other	1,640	33.3
No report	66	1.3
Highest academic degree		
Total	4,923	100.0
Less than bachelor's	175	3.6
Bachelor's	2,761	56.1
Master's	1,660	33.7
Doctorate	229	4.6
No report	98	2.0

[1] Survey respondents out of an estimated 6,500 to 7,500 sanitary engineers active in 1962.

Source: National Science Foundation: *American Science Manpower, 1962.* NSF 64-16. Washington. U.S. Government Printing Office, 1964.

Table 55. PRINCIPAL EMPLOYER, WORK ACTIVITY, AND SPECIALIZATION OF SANITARIAN SURVEY RESPONDENTS: 1962

Employer, primary activity, and specialty	All sanitarians	College graduates	Non-graduates
Number of respondents [1]	7,263	4,583	2,680
Percent by employer	100.0	100.0	100.0
Government	83.7	81.5	87.4
Federal	5.5	5.4	5.7
State	32.2	32.6	31.6
County	29.2	29.4	28.8
City	16.8	14.1	21.3
Nongovernment	16.3	18.5	12.6
Business	11.1	12.0	9.5
Education	2.3	3.6	.1
Other	2.9	2.9	3.0
Percent by activity	100.0	100.0	100.0
Inspection, testing, control	50.3	45.6	58.5
Management, administration	22.6	25.7	17.1
General, production, sales, marketing, other	17.4	15.9	20.1
Consulting, research, teaching, writing	9.7	12.8	4.3
Percent by specialty	100.0	100.0	100.0
Milk	33.1	33.4	32.5
Food, meat	35.4	32.9	39.6
Water, refuse, wastes, vectors	16.2	17.4	14.5
Air pollution, radiation, and occupational health	2.8	3.2	1.9
Recreation, housing, other areas	12.5	13.1	11.5

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[1] Completed questionnaires were returned by 7,902 sanitarians. These included 7,263 persons employed full time in environmental health activities.

Source: Pennell, M. Y., Light, I., and Taylor, D. W.: Sanitarians. *Health Manpower Source Book 16*. PHS Pub. No. 263, Section 16. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1963. Pages 11–18.

Table 56. OCCUPATIONAL HEALTH PERSONNEL EMPLOYED BY STATE AND LOCAL GOVERNMENTS: JANUARY 1968

Occupation	Total personnel [1]	State agencies		Local health departments
		Health	Labor	
All occupations	670	418	93	159
Industrial hygienists and engineers	277	154	47	76
Physicians	52	35	8	9
Nurses (consultant and employee health)	52	40	2	10
Chemists and technicians	115	82	20	13
Sanitarians	31	2	—	29
Radiological health staff [2]	81	60	14	7
Air pollution staff [2]	34	21	—	13
All other	28	24	2	2

[1] Full- and part-time employees in 82 occupational health units—42 States (D.C. and Puerto Rico) and 32 local. Includes radiation, air pollution, and employee health services personnel when part of, or associated with, formal occupational health programs.

[2] Includes radiation protectionists, air pollution specialists, and others listed separately under these segments of programs.

Source: Occupational Health Program: *Directory of Governmental Occupational Health Personnel: January 1968*. Public Health Service, U.S. Department of Health, Education, and Welfare. 28th annual issue. Analysis based on Directory listing of personnel. Data for United States and Puerto Rico.

Table 57. RADIATION PROTECTION PERSONNEL EMPLOYED IN THE UNITED STATES: 1966

Industry	Professional personnel	Technical personnel	Industry	Professional personnel	Technical personnel
Total employed	2,000	2,600	State and local health departments	400	400
Nuclear energy industry	1,000	2,100	Public Health Service	600	100
Radiological health programs	1,000	500			

Sources: U.S. Atomic Energy Commission: 1967 occupational survey, as reported in the Bureau of Labor Statistics' *Occupational Outlook Handbook*, 1968–69 edition. Bulletin No. 1550. U.S. Department of Labor. Washington. U.S. Government Printing Office, 1968.

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National Center for Radiological Health: *Report of State and Local Radiological Health Programs, Fiscal Year 1966*. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office. July 1967.

Table 58. AIR POLLUTION CONTROL PERSONNEL EMPLOYED BY STATE AND LOCAL GOVERNMENTS: 1967

Occupation	Total personnel	Full-time employees	Part-time employees [1]	Occupation	Total personnel	Full-time employees	Part-time employees [1]
Total professional and technical	1,770	1,460	310	Sanitarian	250	130	120
Total professional	1,080	830	250	Total technical	690	630	60
Engineer	530	450	80	Technician	200	180	20
Scientist	300	250	50	Inspector	490	450	40

[1] Persons employed on a full-time basis by their agencies but who spend only a portion of their working time in air pollution control activities.

Source: National Center for Air Pollution Control, Public Health Service.

Table 59. ACADEMIC INSTITUTIONS OFFERING GRADUATE PROGRAMS IN ENVIRONMENTAL PROTECTION SUPPORTED BY SELECTED FEDERAL GRANTS PROGRAMS: 1967

Location	School	Area of program emphasis [1]					
		Air pollution	Industrial hygiene	Radiation protection	Solid wastes	Water supply and/or water pollution	General [2]
	Total, 102 schools	20	19	33	8	78	51
Ala.	Auburn University			x		x	
	University of Alabama		x				
Alaska	University of Alaska					x	x
Ariz.	University of Arizona					x	
Ark.	University of Arkansas			x		x	
Calif.	California Institute of Technology						x
	San Jose State College					x	
	Stanford University					x	x
	University of California, Berkeley		x			x	x
	University of California, Davis					x	x
	University of California, Los Angeles		x	x			x
	University of California, Riverside	x					
	University of Southern California	x					
Colo.	Colorado State University			x		x	
	University of Colorado					x	
Conn.	University of Connecticut					x	
	Yale University	x	x	x			x
Del.	University of Delaware					x	
Fla.	University of Florida	x		x	x	x	x
	University of Miami			x			
Ga.	Emory University			x			
	Georgia Institute of Technology			x	x	x	x
	University of Georgia						x
Hawaii	University of Hawaii					x	x
Idaho	University of Idaho					x	
Ill.	Illinois Institute of Technology						x
	Northwestern University			x		x	x
	University of Illinois	x				x	x
Ind.	Purdue University			x		x	x
	Rose Polytechnic Institute						x
	University of Notre Dame					x	x
Iowa	Iowa State University			x		x	x
	University of Iowa		x				x
Kans.	Kansas State University					x	x
	University of Kansas			x	x	x	
Ky.	University of Kentucky					x	
La.	Louisiana State University					x	
	Tulane University	x					x
Maine	University of Maine					x	
Md.	Johns Hopkins University		x	x		x	x
	University of Maryland					x	
Mass.	Harvard University	x	x	x		x	x
	Massachusetts Institute of Technology						x
	Northeastern University					x	x
	Tufts University					x	x
	University of Massachusetts					x	x

See footnotes at end of table.

Table 59. ACADEMIC INSTITUTIONS OFFERING GRADUATE PROGRAMS IN ENVIRONMENTAL PROTECTION SUPPORTED BY SELECTED FEDERAL GRANTS PROGRAMS: 1967—Continued

Location	School	Area of program emphasis [1]					
		Air pollution	Industrial hygiene	Radiation protection	Solid wastes	Water supply and/or water pollution	General [2]
Mich	Michigan State University					x	x
	University of Michigan	x	x	x	x	x	x
	Wayne State University		x			x	x
Minn	University of Minnesota	x		x		x	x
Miss	Mississippi State University					x	
Mo	University of Missouri					x	
	Washington University						x
Mont	Montana State University					x	
Nebr	University of Nebraska					x	
Nev	University of Nevada					x	
N.H	University of New Hampshire					x	
N.J	Rutgers, The State University			x		x	x
N. Mex	New Mexico State University					x	x
N.Y	Columbia University			x			x
	Cornell University					x	x
	CUNY City College		x				
	Manhattan College					x	
	New York University	x		x		x	
	Renxsselaer Polytechnic Institute			x	x		
	Syracuse University						x
	University of Rochester		x				
N.C	North Carolina State University					x	
	University of North Carolina		x	x		x	x
N. Dak	North Dakota State University			x		x	x
Ohio	Ohio State University		x			x	x
	University of Akron					x	
	University of Cincinnati	x	x	x		x	x
	University of Toledo					x	
Okla	Oklahoma State University					x	
	University of Oklahoma		x	x		x	x
Oreg	Oregon State University	x		x		x	x
Pa	Drexel Institute of Technology	x	x		x		x
	Pennsylvania State University	x				x	x
	Temple University	x		x			
	University of Pennsylvania			x			
	University of Pittsburgh		x	x		x	x
R.I	University of Rhode Island					x	
S.C	Clemson University					x	
S. Dak	South Dakota State University					x	
Tenn	University of Tennessee			x		x	
	Vanderbilt University	x				x	
Tex	North Texas State University					x	
	Rice University					x	
	Texas A. & M. University	x				x	
	University of Texas		x	x	x	x	x
Utah	University of Utah	x				x	
	Utah State University					x	
Vt	University of Vermont					x	

See footnotes at end of table.

Table 59. ACADEMIC INSTITUTIONS OFFERING GRADUATE PROGRAMS IN ENVIRONMENTAL PROTECTION SUPPORTED BY SELECTED FEDERAL GRANTS PROGRAMS: 1967—Continued

Location	School	Area of program emphasis [1]					
		Air pollution	Industrial hygiene	Radiation protection	Solid wastes	Water supply and/or water pollution	General [2]
Va.	Virginia Polytechnic Institute					x	x
Wash.	University of Washington	x	x	x		x	x
	Washington State University			x		x	
W. Va.	West Virginia University	x			x	x	x
Wis.	Marquette University					x	
	University of Wisconsin					x	
Wyo.	University of Wyoming					x	
P.R.	University of Puerto Rico						x

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[1] Includes research training in each program.

[2] Includes one or more of the following, as illustrations: Public health, injury control, toxicology, food protection, systems planning, etc.

Sources: Department of Health, Education, and Welfare, Public Health Service, Bureau of Disease Prevention and Environmental Control; National Institutes of Health; Department of the Interior, Federal Water Pollution Control Administration; and Office of Water Resources Research, Atomic Energy Commission.

Table 60. STIPENDS AWARDED UNDER SELECTED FEDERAL GOVERNMENT TRAINING PROGRAMS FOR GRADUATE STUDY IN ENVIRONMENTAL PROTECTION: 1967

Type of program [1]	All Federal agencies			Public Health Service		
	Environmental engineers	Sanitarians	Environmental specialists	Environmental engineers	Sanitarians	Environmental specialists
All programs	664	52	855	350	52	698
Air pollution	51	—	103	51	—	103
Radiation protection	49	—	327	49	—	327
Industrial hygiene	6	2	32	250	52	268
Solid wastes	31	—	27			
Water supply/water pollution	315	—	157			
General [2]	212	50	209			

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[1] Includes research training in each program.

[2] Includes one or more persons from the following areas: Occupational health, toxicology, food protection, accident prevention.

Sources: Department of Health, Education, and Welfare, Public Health Service, Bureau of Disease Prevention and Environmental Control, and National Institutes of Health; Department of the Interior, Federal Water Pollution Control Administration; Atomic Energy Commission.

Table 61. EARNED GRADUATE DEGREES CONFERRED IN ENVIRONMENTAL ENGINEERING: SELECTED YEARS, 1950–51 THROUGH 1965–66

Academic year	Master's	Doctor's	Academic year	Master's	Doctor's
1965–66 [1]	181	23	1960–61	74	12
1964–65	133	13	1959–60	85	6
1963–64	126	22	1954–55	75	6
1962–63	95	10	1950–51	69	4
1961–62	79	13			

[1] In 1965–66, master's degrees were reported by 28 schools and doctor's degrees by 10 schools.

Source: National Center for Educational Statistics: *Engineering Degrees*. OE–54006–66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1967.

Table 62. ACADEMIC INSTITUTIONS OFFERING UNDERGRADUATE PROGRAMS IN ENVIRONMENTAL HEALTH: 1968

Location	School	Location	School
	Total, 30 schools.[1]	Louisiana	Louisiana State University, Baton Rouge. McNeese State College, Lake Charles.
Alabama	Troy State College, Troy.	Massachusetts	University of Massachusetts, Amherst.
California	California State College, Los Angeles. California State College, Long Beach. Fresno State College, Fresno. Sacramento State College, Sacramento. San Diego State College, San Diego. San Fernando State College, San Fernando. San Jose State College, San Jose.	Michigan	Ferris State College, Big Rapids.
		Montana	Montana State College, Bozeman.
		New Jersey	Rutgers, The State University, New Brunswick.
		Oklahoma	University of Oklahoma, Norman.
		Oregon	Oregon State University, Corvallis. Portland State College, Portland.
		South Dakota	South Dakota State University, Brookings.
District of Columbia.	George Washington University, Washington.	Tennessee	East Tennessee State University, Johnson City.
Florida	Florida State University, Tallahassee. University of Florida, Gainesville.	Utah	Brigham Young University, Provo. Utah State University, Logan.
Illinois	Southern Illinois University, Carbondale.	Washington	University of Washington, Seattle. Washington State University, Pullman.
Indiana	University of Indiana, Indianapolis. Indiana State University, Terre Haute.	Wisconsin	Wisconsin State University, Eau Claire.

[1] Data not available on number of students enrolled in these courses.

Source: National Association of Sanitarians.

CHAPTER 12

Food and Drug Protective Services

Government and industry share in the efforts to protect health and lives through safeguarding the quality of food and drugs. Protective services are an important part of the work of several of the health manpower categories. Food technologists, government food and drug inspectors, and government food and drug analysts are discussed in this chapter, but the reader should also refer to chapter 23 on pharmacists, chapter 32 on veterinarians, and chapter 11 on sanitarians and other environmental health personnel.

Food Technologist

The *food technologist* applies science and engineering to the production, processing, packaging, distribution, preparation, and utilization of foods. His scientific knowledge and special skills are employed to solve technological problems connected with the development of new products, processes, or equipment; selection of raw materials; fundamental changes in the composition or physical condition of food for industrial processing, or the nutritional value and suitability of such foods for human consumption.

The Institute of Food Technologists (IFT) estimates that approximately 20,000 individuals were employed as food technologists in 1967. The majority of food technologists are employed by private industry. However, a survey of the nearly 10,000 IFT members shows that 16 percent are involved in research and teaching in educational and private research institutions, 7 percent are employed by government, and 7 percent offer consulting services to the food industry.

In terms of work activity, the greatest numbers are engaged in product development. Many others are involved in quality control, basic research, engineering, production, and packaging.

Almost one-fourth of the members of the Institute of Food Technologists have a doctorate, about one-fifth have a master's degree, the balance hold a bachelor's degree.

A bachelor's degree in food science or in a related science such as chemistry, biochemistry, biology, or bacteriology, or in engineering is the minimum educational requirement for entrance into the field. Earned degrees conferred in food science and technology in 1965–66 include 240 bachelor's, 123 master's, and 57 doctor's (tables 63 and 64).

Government Food and Drug Inspector and Analyst

Both the Federal Government and the States have food and drug laws which are enforced by two units of the Federal Government and by State and local health agencies. The Food and Drug Administration of the U.S. Department of Health, Education, and Welfare has broad responsibilities for food and drug protective services and employs inspectors and analysts who are concerned with the purity and safety of food, drugs, and cosmetics and with the effectiveness of drugs.

In 1955, the Food and Drug Administration had fewer than 900 total employees; in 1960, over 1,500; and by 1967, nearly 5,000. The Meat Inspection Branch of the U.S. Department of Agriculture which regulates all meat food products in interstate commerce also employs food inspectors, most of whom are veterinarians. (See ch. 32.) The State and local health agencies handle the inspection in various ways.

The FDA *food and drug inspector* tries to provide protection before the product reaches the consumer by checking the processes involved from raw material to delivery, including the conditions under which it is manufactured and the package labeling. The inspector is usually a college graduate with a science major. In 1967, FDA employed 800 food and drug inspectors.

The FDA *food and drug analyst* provides more intensive checking of the inspector's samples

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for purity and whether they comply with their labels. These experts engage in research work on the safety and effectiveness of products and on the development of methods for analysis. In 1967, FDA employed 700 food and drug analysts.

The minimum educational requirement for a laboratory analyst is 4 years of college, with a major in chemistry, bacteriology, pharmacology or a related science. A master's or a doctor's degree in the field of specialization is required for the research analyst's top positions.

Table 63. EARNED DEGREES CONFERRED IN FOOD SCIENCE AND TECHNOLOGY: 1960–61 THROUGH 1965–66

Academic year	Bachelor's	Master's	Doctor's	Academic year	Bachelor's	Master's	Doctor's
1965–66	240	123	57	1962–63	121	58	30
1964–65	208	103	34	1961–62	108	49	19
1963–64	109	84	37	1960–61	77	45	17

Source: National Center for Educational Statistics: *Summary Report on Bachelor's and Higher Degrees Conferred During the Year 1965–66*. OE 54013A–66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968. Also prior annual issues.

Table 64. LOCATION OF SCHOOLS THAT OFFER TRAINING IN FOOD SCIENCE AND TECHNOLOGY, 1968; AND NUMBERS OF GRADUATES, 1965–66

Location	School [1]	Bachelor's	Master's	Doctor's
	Total, 48 schools	240	123	57
Ala.	Tuskegee Institute, Tuskegee Institute [2]	—	2	—
Ark.	University of Arkansas, Fayetteville	—	—	—
Calif.	California State Polytechnic College, San Luis Obispo	12	—	—
	Fresno State College, Fresno [2]	2	—	—
	University of California, Berkeley	5	1	—
	University of California, Davis	15	17	—
Conn.	University of Connecticut, Storrs	5	1	—
Fla.	University of Florida, Gainesville	5	2	—
Ga.	University of Georgia, Athens	26	5	—
Hawaii	University of Hawaii, Honolulu	—	5	—
Ill.	University of Illinois, Urbana	10	8	10
Ind.	Purdue University, Lafayette	6	—	—
Iowa	Iowa State University, Ames	12	3	—
Kans.	Kansas State University, Manhattan	4	4	—
Ky.	University of Kentucky, Lexington	2	—	—
La.	Louisiana State University, Baton Rouge	2	7	2
	Southeastern Louisiana College, Hammond [2]	5	—	—
Md.	University of Maryland, College Park	—	1	—
Mass.	Massachusetts Institute of Technology, Cambridge	—	—	—
	University of Massachusetts, Amherst	10	9	11
Mich.	Michigan State University, East Lansing	11	11	12
Minn.	University of Minnesota, Minneapolis	5	1	2
Miss.	Mississippi State University, State College	2	—	—
Mo.	University of Missouri, Columbia	—	—	—
Nebr.	University of Nebraska, Lincoln	—	—	—
N.J.	Rutgers, The State University, New Brunswick	6	4	1
N.Y.	Columbia University, New York	—	—	—
	Cornell University, Ithaca	—	—	—
	SUNY, College of Agriculture at Cornell University, Ithaca.[2]	10	1	1
N.C.	NCS of the University of North Carolina, Raleigh	7	6	2
Ohio	Ohio State University, Columbus	13	—	2
Okla.	Oklahoma State University, Stillwater	—	2	—
Oreg.	Oregon State University, Corvallis	12	6	8
Pa.	Delaware Valley College, Doylestown [2]	11	—	—
	Pennsylvania State University, University Park	20	—	—
R.I.	University of Rhode Island, Kingston	—	—	—
S.C.	Clemson University, Clemson	1	—	—
S. Dak.	South Dakota State University, Brookings	—	—	—
Tenn.	University of Tennessee, Knoxville	8	8	—
Tex.	Texas Agricultural and Mechanical College, College Station	1	—	—
	Texas Technological College, Lubbock [2]	5	1	—
Utah	Utah State University, Logan	—	3	1
Va.	Virginia Polytechnic Institute, Blacksburg	—	—	—
Wash.	University of Washington, Seattle	—	—	—
	Washington State University, Pullman	—	2	2
W. Va.	West Virginia University, Morgantown	1	—	—
Wis.	University of Wisconsin, Madison	5	13	3
Wyo.	University of Wyoming, Laramie	1	—	—

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[1] All public institutions except Columbia University, Cornell University, Delaware Valley College, and Tuskegee Institute.

[2] Not on IFT list for 1968.

Sources: Institute of Food Technologists for list of institutions.
U.S. National Center for Educational Statistics: *Earned Degrees Conferred 1965-66*. OE-54013-66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968.

CHAPTER 13

Health and Vital Statistics

The growing importance of mathematics and statistics is a direct result of the increasing complexity of the activities within the health field. Statistical data are required in administrative planning and evaluation, as well as in research and interpretation of the health needs of the community to the public. The scope of the field includes the collection, processing, analysis, and publication of health statistics including medical and vital statistics. (See also the chapters on administration of health services in health departments, automatic data processing, and medical records.)

Health statisticians—sometimes called *biostatisticians*—are primarily concerned with the use of statistical theory, techniques, and methods to determine useful measurements or meaningful relationships of quantified information on a particular subject relating to health or disease. They help in identifying and measuring health problems as a basis for evaluating progress and planning, and also in the scientific study of the causes, processes, and cures of disease. Another major function of the health statistician is to devise special studies and analyses for use in planning and evaluating health services.

According to the latest data available, about 1,000 to 2,000 statisticians were active in the health field in 1965. The 717 members of the statistics section of the American Public Health Association, Inc., probably represent one-third or more of the total workers. In addition, there are a number of statisticians in the Mental Health, Medical Care, and Maternal and Child Health Sections. The majority are employed by Federal, State, or local governments (tables 7 and 9, introduction). Others work in voluntary health agencies, industrial organizations, hospitals, and schools.

A bachelor's degree with courses in mathematics, physical sciences, biological sciences, and social sciences is the usual requirement for beginning positions as health statisticians. Advanced training in statistics and public health leading to a master's or doctor's degree is desirable. In 1966–67, U.S. schools of public health awarded graduate degrees to 52 statisticians, 36 of whom were sponsored by the U.S. Public Health Service (table 6, introduction). The numbers of earned degrees in statistics are presented in tables 65 and 66.

The less complex and routine statistical functions are performed by *statistical clerks* who usually have a background of high school mathematics. They may abstract material from technical reports and prepare code sheets from which data can be summarized or tabulated. Other duties are to help analyze statistical data, compute and verify statistical tables, draft graphic presentations, and maintain files of records and worksheets. Estimates of the numbers of statistical clerks currently employed in the health field are not available.

Vital record registrars may be public health statisticians or persons with educational backgrounds in business administration, law, science, or arts. Registrars direct and coordinate the registration of births and deaths, and usually marriages and divorces, in large registration systems of States and in some large cities and counties. They recommend changes in record forms, legislation, and regulations, and make final decisions on registration problems and the issuance of certifications. Probably fewer than 300 persons qualify through education and experience for the professional character of the position. Several thousand persons have subordinate positions in the field of vital records (tables 7 and 9, Introduction).

Health demographers have interests similar to those of health statisticians and vital record registrars, but with greater concentration on the measurement of the elements of population growth such as factors associated with family formation and dissolution, fertility, and death and the relation of these factors to economic development. Demographers are represented in the health field in small numbers.

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Table 65. EARNED DEGREES CONFERRED IN MATHEMATICS AND STATISTICS: 1960–61 THROUGH 1965–66

Academic year	Mathematics				Statistics			
	Bachelor's	1st professional requiring 6 or more years [1]	Master's	Doctor's	Bachelor's	1st professional requiring 6 or more years [1]	Master's	Doctor's
1965–66	19, 842	3	4, 387	676	248	—	385	106
1964–65	19, 256	14	3, 853	606	294	17	295	76
1963–64	18, 391	28	3, 346	520	258	—	257	76
1962–63	15, 923	25	3, 051	433	173	—	272	57
1961–62	14, 509	1	2, 464	348	100	—	216	48
1960–61	13, 047	—	2, 098	292	80	—	140	52

[1] Prior to 1965–66, the requirement was 5 or more years.

Source: National Center for Educational Statistics: *Summary Report on Bachelor's and Higher Degrees Conferred During the Year 1965–66*. OE 54013A–66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968. Also prior annual issues. Data for United States, Canal Zone, Puerto Rico, and the Virgin Islands.

Table 66. LOCATION AND OWNERSHIP OF SCHOOLS CONFERRING DEGREES IN STATISTICS AND NUMBER OF GRADUATES: 1965–66

Location	School	Ownership	Bachelor's	Master's	Doctor's
	Total, 69 schools		248	385	106
Ala.	University of Alabama, Tuscaloosa	Public	2	—	—
Ariz.	University of Arizona, Tucson	do	2	—	—
Calif.	San Francisco State College, San Francisco	do	6	—	—
	Stanford University, Stanford	Private	12	27	15
	University of California, Berkeley	Public	7	22	12
	University of California, Los Angeles	do	8	3	4
Colo.	University of Colorado, Boulder	do	6	—	—
	University of Denver, Denver	Private	2	3	—
Conn.	University of Connecticut, Storrs	Public	—	2	—
	Yale University, New Haven	Private	—	4	—
Del.	University of Delaware, Newark	Public	1	5	—
D.C.	American University, Washington	Private	1	3	—
	George Washington University, Washington	do	9	5	—
Fla.	Florida State University, Tallahassee	Public	2	18	1
	University of Florida, Gainesville	do	3	6	—
Ga.	Georgia State College, Atlanta	do	11	3	—
Ill.	University of Illinois, Main Campus, Urbana	do	5	3	1
	University of Chicago, Chicago	Private	—	7	1
Ind.	Purdue University, Lafayette	Public	—	10	1
Iowa	Drake University, Des Moines	Private	7	—	—
	Iowa State University of Science & Technology, Ames.	Public	4	5	4
	University of Iowa, Iowa City	do	—	13	2
Kans.	Kansas City University Agricultural & Applied Sciences, Manhattan.	do	3	14	—
Ky.	University of Kentucky, Lexington	do	1	—	—
La.	McNeese State College, Lake Charles	do	2	—	—
	Tulane University of Louisiana, New Orleans	Private	—	7	—

Table 66. LOCATION AND OWNERSHIP OF SCHOOLS CONFERRING DEGREES IN STATISTICS AND NUMBER OF GRADUATES: 1965–66—Continued

Location	School	Ownership	Bachelor's	Master's	Doctor's
Md.	Johns Hopkins University, Baltimore	do	1	—	3
	University of Maryland, College Park	Public	9	1	—
Mass.	Harvard University, Cambridge	Private	2	6	6
	Northeastern University, Boston	do	—	12	—
	University of Massachusetts, Amherst	Public	—	8	—
Mich.	Michigan State University, Main Campus, East Lansing.	do	2	10	1
Minn.	University of Minnesota, Minneapolis	do	1	5	10
Mo.	University of Missouri at Columbia	do	4	3	1
Mont.	Montana State University, Missoula	do	—	1	—
N.J.	Rutgers, The State University, New Brunswick	do	—	34	4
N.Y.	Columbia University, Main Division, New York	Private	—	11	3
	Cornell University, Main Campus, Ithaca	do	—	5	1
	CUNY City College, New York	Public	22	7	—
	CUNY Hunter College, New York	do	1	—	—
	New York University, New York	Private	7	17	2
	SUNY State University of Buffalo, Buffalo	Public	1	—	—
	Syracuse University, Syracuse	Private	—	1	2
	University of Rochester, Rochester	do	—	3	—
N.C.	North Carolina State University, Raleigh	Public	11	17	8
	University of North Carolina, Chapel Hill	do	—	—	2
Ohio	Bowling Green State University, Bowling Green	do	11	—	—
	University of Toledo, Toledo	do	2	—	—
	Western Reserve University, Cleveland	Private	—	7	3
Okla.	University of Oklahoma, Norman	Public	8	—	—
Oreg.	Oregon State University, Corvallis	do	—	2	—
Pa.	Lehigh University, Bethlehem	Private	2	—	—
	Pennsylvania State University, University Park	Public	—	2	—
	Temple University, Philadelphia	Private	—	3	—
	University of Pennsylvania, Philadelphia	do	8	4	—
	University of Pittsburgh, Pittsburgh	do	—	4	4
	University of Scranton, Scranton	do	2	1	—
	Villanova University, Villanova	do	—	3	—
Tenn.	University of Tennessee, Knoxville	Public	15	2	—
Tex.	Southern Methodist University, Dallas	Private	4	11	—
	Texas A. & M. University, College Station	Public	—	6	1
	University of Texas, Austin	do	10	—	1
Utah	Brigham Young University, Provo	Private	8	2	—
	Utah State University, Logan	Public	12	3	—
Va.	Hollins College, Hollins	Private	1	—	—
	Virginia Polytechnic Institute, Blacksburg	Public	4	11	10
Wash.	University of Washington, Seattle	do	—	3	—
Wis.	University of Wisconsin, Madison	do	3	14	3
Wyo.	University of Wyoming, Laramie	do	3	6	—

Source: National Center for Educational Statistics: *Earned Degrees Conferred 1965–66*. OE–54013–66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968.

CHAPTER 14

Health Education

Health education is the process through which individuals acquire knowledge and behavior consistent with the achievement of optimum individual and community health. The practitioners of health education are public health educators and school health educators.

The *public health educator* has a major interest in educating all segments of the community and is concerned with those forces which create or change behavior. His talents may also be directed toward assisting the staff of his organization to maximize their educational opportunities. The Society of Public Health Educators (450 members in 1967) estimates that since 1950 the number of public health educators has tripled, from about 600 to more than 1,800 in 1967. More than one-third of these persons are employed by State and local health departments and a small number, by the U.S. Public Health Service (tables 7 and 9, Introduction). The balance are employed by voluntary health agencies, schools and colleges, hospitals and clinics, and industry.

The public health educator receives his preparation in a school of public health. Admission to these schools generally requires a bachelor's degree in health education or an allied field. In the academic year 1967–68, 108 U.S. students received master's degrees (tables 67 and 68). Although many public health educators working in the field today have not had this type of professional preparation, it is being required by relatively more employing agencies.

The American Public Health Association has now agreed to accredit curricula in health education in institutions other than a school of public health.

While the public health educator focuses his educational activities on the nonschool community, the *school health educator* is mainly concerned with classroom teaching and other influences which the school exerts on health knowledge, behavior, and attitudes. Within a school system, he may coordinate the work of all groups in the community which are interested in the health of the school child and furnish leadership in developing and maintaining an adequate, well-balanced health program.

Since responsibility for health education programs in schools is often shared with other subject areas, it is difficult to identify all school health educators. The number employed in 1967 may approach 18,000 or three times the membership of the American Association for Health, Physical Education, and Recreation which has been identified as having primary responsibility for school or service programs.

The school health educator must meet the regular certification standards for teachers in his State. He is required to have 4 years of college education leading to a bachelor's degree, with a background in the biological, physical, and social sciences as well as in health education. A master's degree in the field of health education is being increasingly required (table 69).

In both school and community health education, augmented numbers of auxiliary personnel with lesser levels of preparation are performing health education tasks in settings appropriate to their skills.

Table 67. SCHOOLS OF PUBLIC HEALTH OFFERING PROGRAMS IN PUBLIC HEALTH EDUCATION, AND NUMBERS OF GRADUATES: 1959–60 THROUGH 1967–68

Academic year	Number of schools	Master's [1]	Doctor's [1]	Academic year	Number of schools	Master's [1]	Doctor's [1]
1967–68	10	108		1962–63	9	80	5
1966–67	10	100		1961–62	9	69	6
1965–66	10	103		1960–61	6	86	2
1964–65	10	111	1	1959–60	6	74	1
1963–64	9	92	3				

[1] Includes foreign students.

Sources: U.S. Department of Health, Education, and Welfare, Public Health Service, Division of Medical Care Administration, Office of Health Education; and individual schools.

Table 68. LOCATION AND OWNERSHIP OF SCHOOLS OF PUBLIC HEALTH OFFERING CURRICULA IN PUBLIC HEALTH EDUCATION AND NUMBERS OF STUDENTS SPECIALIZING IN PUBLIC HEALTH EDUCATION AWARDED MASTER'S DEGREES: 1967–68

Location	School	Ownership	Master's
	Total, 10 schools		[1] 108
Calif	University of California, Berkeley	Public	15
	University of California, Los Angeles	do	11
Conn	Yale University, New Haven	Private	10
Hawaii	University of Hawaii, Honolulu	Public	6
Mass	Harvard University, Boston	Private	—
Mich	University of Michigan, Ann Arbor	Public	20
Minn	University of Minnesota, Minneapolis	do	—
N.Y	Columbia University, New York	Private	3
N.C	University of North Carolina, Chapel Hill	Public	22
P.R	University of Puerto Rico, San Juan	do	21

[1] Includes foreign students.

Source: Individual schools.

Table 69. LOCATION AND OWNERSHIP OF SCHOOLS OFFERING SPECIALIZATION IN HEALTH EDUCATION AT UNDERGRADUATE AND GRADUATE LEVELS AND NUMBERS OF GRADUATES: 1967

Location	School	Ownership	Bachelor's	Master's	Doctor's
	Total, 78 schools		1, 468	1, 116	144
Ariz.	Arizona State University, Tempe	Public	22	(1)	(1)
	University of Arizona, Tucson	do	13	5	(1)
Ark.	University of Arkansas, Fayetteville	do	(1)	3	(1)
Calif.	California State College, Long Beach	do	42	(1)	(1)
	California State College, Los Angeles	do	(1)	285	(1)
	Fresno State College, Fresno	do	26	16	(1)
	Sacramento State College, Sacramento	do	14	20	(1)
	San Diego State College, San Diego	do	40	19	(1)
	San Fernando Valley State College, Northridge	do	73	47	(1)
	San Francisco State College, San Francisco	do	30	(1)	(1)
	San Jose State College, San Jose	do	30	(1)	(1)
	Stanford University, Stanford	Private	(1)	10	5
	University of California, Los Angeles	Public	5	23	3
	University of the Pacific, Stockton	Private	(1)	—	(1)
	University of Southern California, Los Angeles	do	(1)	3	4
Colo.	Colorado State College, Greeley	Public	(1)	13	7
Conn.	University of Connecticut, Storrs	do	—	(1)	(1)
Fla.	Florida State University, Tallahassee	do	14	5	(1)
	University of Florida, Gainesville	do	25	(1)	(1)
Ill.	George Williams College, Downer's Grove	Private	(1)	7	(1)
	Northwestern University, Evanston	do	4	2	(1)
	Southern Illinois University, Carbondale	Public	41	43	6
	University of Illinois, Champaign	do	22	11	10
	Western Illinois University, Macomb	do	(2)	(1)	(1)
Ind.	Ball State University, Muncie	do	7	10	(1)
	Indiana State University, Terre Haute	do	26	17	(1)
	Indiana University, Bloomington	do	15	40	12
	Purdue University, West Lafayette	do	2	—	2
Ky.	Eastern Kentucky University, Richmond	do	6	(1)	(1)
	Morehead State University, Morehead	do	(2)	(1)	(1)
	University of Kentucky, Lexington	do	(2)	(1)	(1)
La.	Louisiana State University, Baton Rouge	do	(1)	2	(1)
Md.	Morgan State College, Baltimore	do	5	(1)	(1)
	University of Maryland, College Park	do	15	25	5
Mass.	Boston University, Boston	Private	82	40	10
	Springfield College, Springfield	do	6	(1)	(1)
	State College at Lowell, Lowell	Public	15	(1)	(1)
	University of Massachusetts, Amherst	do	9	3	(1)
Mich.	Central Michigan University, Mount Pleasant	do	(1)	13	(1)
	Michigan State University, East Lansing	do	20	3	—
	University of Michigan, Ann Arbor	do	(1)	4	4
	Wayne State University, Detroit	do	(1)	(2)	(1)
Minn.	Mankato State College, Mankato	do	26	20	(1)
	University of Minnestoa, Minneapolis	do	(1)	4	2
N.Y.	CUNY, Brooklyn College, Brooklyn	do	31	(2)	(1)
	CUNY Hunter College, New York	do	(1)	85	(1)
	Columbia University, Teachers College, New York.	Private	(1)	22	21
	New York University, New York	do	28	15	8
	SUNY at Brockport, Brockport	Public	(1)	13	(1)
	SUNY at Cortland, Cortland	do	201	51	(1)
	SUNY at Buffalo, Buffalo	do	(1)	42	1
	Syracuse University, Syracuse	Private	6	—	—

See footnotes at end of table.

Table 69. LOCATION AND OWNERSHIP OF SCHOOLS OFFERING SPECIALIZATION IN HEALTH EDUCATION AT UNDERGRADUATE AND GRADUATE LEVELS AND NUMBERS OF GRADUATES: 1967—Continued

Location	School	Ownership	Bachelor's	Master's	Doctor's
N.C.	North Carolina College, Durham	Public	125	(1)	(1)
	University of North Carolina, Chapel Hill	do	(1)	26	4
	University of North Carolina, Greensboro	do	1	(2)	(1)
Ohio	Kent State University, Kent	do	22	4	(1)
	Ohio State University, Columbus	do	26	13	7
	University of Cincinnati, Cincinnati	do	5	(1)	(1)
	University of Toledo, Toledo	do	15	6	3
Oreg.	Oregon State University, Corvallis	do	21	26	4
	Portland State College, Portland	do	25	(1)	(1)
	University of Oregon, Eugene	do	103	38	8
Pa.	Temple University, Philadelphia	Private	(1)	22	5
Tenn.	East Tennessee State University, Johnson City	Public	66	3	(1)
	University of Tennessee, Knoxville	do	17	12	(1)
Tex.	North Texas State University, Denton	do	1	(1)	(1)
	Sam Houston State College, Huntsville	do	27	3	(1)
	Texas Southern University, Houston	do	4	2	(1)
	Texas Woman's University, Denton	do	(1)	6	3
	University of Texas, Austin	do	(2)	1	4
Utah	Brigham Young University, Provo	Private	42	14	(1)
	University of Utah, Salt Lake City	Public	6	2	(1)
	Utah State University, Logan	do	20	(1)	(1)
Va.	Madison College, Harrisonburg	do	5	(1)	(1)
Wash.	University of Washington, Seattle	do	30	(1)	(1)
W. Va.	West Virginia State College, Institute	do	6	(1)	(1)
	West Virginia University, Morgantown	do	(1)	12	4
Wis.	University of Wisconsin, Madison	do	(1)	5	2

[1] No program.

[2] New program beginning 1967.

Source: *Institutions Offering Programs of Specialization in Health Education.* School Health Education Study: Washington, D.C. December 1967.

CHAPTER 15

Health Information and Communication

The importance of making authoritative health information available to the public in an understandable and appealing form is reflected in the increasing numbers of writers and graphic arts specialists employed by health organizations. Some of these staff members are also involved with making professional, scientific, and technical information accessible to the health specialists themselves.

Among the occupations concerned with health communications are (a) information specialists and science writers, (b) technical writers, (c) illustrators, poster and display artists, and draftsmen and (d) medical illustrators. The numbers employed in the health field in 1967 probably exceeded 4,500 and may have been considerably higher.

Information Specialist and Science Writer

An estimated 2,000 persons were employed in 1967 as health information specialists or science writers. The distinction between these two careers depends primarily on where they work rather than on what they do. The estimated number was provided by the National Association of Science Writers, Inc., which has 833 members in 1968.

The health *science writer* is a journalist who specializes in health or other scientific subjects. He writes for newspapers, magazines, radio, television, or for scientific or professional publications to acquaint the public with developments in the fields of science, including medicine. Science writers are employed by newspapers, serve as editors or writers on magazines and in publishing houses, or have staff positions as information specialists in scientific and health organizations. A substantial proportion are freelance writers, working on their own time.

The *health information specialist* is employed by large health organizations to inform the public of achievements as well as programs of the organization. To accomplish this, he makes use of leaflets and other publications, newspapers, magazines, radio, television, exhibits, and motion pictures.

The minimum education for a communication specialist is 4 years of college with a bachelor's degree. English or journalism is the usual major, with some science courses advisable.

Technical Writer

The technical writer and the science writer deal with the same general subject matter, but each focuses mainly on a particular group of readers. The technical writer's specialty is writing about scientific and technical developments primarily for professional persons in the field. For this reason and because it is technical in nature, the emphasis is on specifics written in great detail.

Some technical writers specializing in the health sciences work for universities, foundations, Federal agencies, and other organizations with research programs. Others are employed by professional societies, scientific and medical publishers, manufacturers, and other businesses with health-related interests. A few also work on freelance assignments.

Well over 30,000 *technical writers* and *editors* were employed in 1967, 20 percent of whom were active in the biomedical sciences. Very few of the 4,000 members of the Society of Technical Writers and Publishers, Inc., in 1967 are known to be in the health field. The American Medical Writers Association (2,000 members) made no estimate of the total employment in the health field.

Illustrator, Poster and Display Artist, and Draftsman

Illustrators, poster and display artists, and *draftsmen* have been drawn into health activities by the increasing emphasis on providing information to the public. Unlike medical art, this kind of work does not require special scientific training for functioning in the health field. The technical skill of a commercial artist is needed plus a flair for putting abstract ideas into visual form. Training in this field is usually acquired from technical institutes, colleges offering special 2-year programs, vocational and technical high schools, and correspondence schools. Training may also be obtained through apprenticeship programs or on-the-job programs.

Technicians in visual presentation are employed by health departments in cities, counties, States, and the Federal Government. Some also work for large voluntary health agencies. No information is available on the number of draftsmen in the health field, and there is no association that represents them.

Medical Illustrator

An estimated 500 or more persons were employed as *medical illustrators* in 1967 according to the Association of Medical Illustrators (210 active members). Medical illustrators, including medical photographers, work with physicians, research scientists, medical educators, authors, and others to graphically record facts and progress in the health field. They serve a vital role in the communication of scientific information through drawing, photography, television, and other communication media.

For the most part, medical artists work for hospitals, clinics, medical schools, public and private research institutes, large pharmaceutical firms, and medical publishing houses. Medical illustrators may also freelance, and some combine freelancing with a part-time salaried position in a hospital or other medical institution.

Six medical facilities offer courses in medical illustration of not less than 20 months or 2 academic years (table 70). The entrance requirements include 3 to 5 years of college level background in biological sciences, art, and specialized study after graduation from high school. A total of 57 students were enrolled in 1967, to be graduated over a 3-year period.

Table 70. LOCATION AND OWNERSHIP OF SCHOOLS OFFERING COURSES IN MEDICAL ILLUSTRATION: 1967

Location	School	Ownership	Curricula offered		
			Certificate only	Bachelor's degree	Master's degree
	Total, 6 schools		1	2	4
Ga.	Medical College of Georgia, Department of Art as Applied to Medicine, Augusta.	Public		x	x
Ill.	University of Illinois College of Medicine, Department of Medical and Dental Illustration, Chicago.	Public		x	
Md.	Johns Hopkins University School of Medicine, Department of Art as Applied to Medicine, Baltimore.	Private			x
Mich.	University of Michigan Medical School, Medical and Biological Illustration, Ann Arbor.	Public			x
Ohio	University of Cincinnati College of Medicine, School of Medical Illustration, Cincinnati.	Public	x		
Tex.	University of Texas Southwestern Medical School, Department of Medical Art and Visual Education, Dallas.	Public			x

Source: Association of Medical Illustrators.

CHAPTER 16

Library Services in the Health Field

Library services in the health field are designed to meet the needs of professional staff—medical, scientific, administrative and others; the needs of professional schools—medical, dental, nursing, and other disciplines; and the needs of hospital patients. The kinds of library services offered vary with the function and size of the institution.

In this chapter, medical librarians are designated as those who provide library services to meet the needs of professional staff and of professional schools. They may also be responsible for the needs of hospital patients, but librarians concerned only with patients are designated as patients' librarians. Medical record services are described in chapter 17 and should not be confused with library services.

Medical Librarian

The medical library has as its function the acquisition, indexing, cataloging, classification, storage, and dissemination of medical knowledge. The primary purpose of these libraries is to assist in education, communication of health knowledge, and the improvement of health practices.

Estimates indicate that medical libraries are located in about 3,200 hospitals; 1,100 schools and colleges of medicine, dentistry, nursing, pharmacy, and other health disciplines; 1,100 research and industrial institutions; and 1,000 Federal Government installations (*23*). Of the estimated 6,400 medical libraries, probably only three out of four have a staff employed either full or part time.

Medical librarians in educational institutions, departments of public health, pharmaceutical firms, insurance companies, and general biomedical research institutions work with physicians and other health and research workers, as well as with students preparing for careers in health fields.

Estimates developed by the National Library of Medicine and the National Center for Health Statistics show that probably 8,000 persons were employed in 1965 to staff the specialized health-related libraries in the United States, with fewer than 3,000 of these persons professionally trained as differentiated from clerical staff. It is estimated that about 1,000 are trained medical librarians, of whom about 700 have met the requirements for certification by the Medical Library Association.

The Medical Library Association reports 1,200 member librarians; the Association of Hospital and Institution Libraries, 800 member librarians. Unpublished data from the 1966 PHS–AHA survey show 2,347 medical librarians in reporting hospitals, of whom 602 were certified by the Medical Library Association.

Of the 39 accredited U.S. schools which offer a master's degree in library science, 15 offer special courses in medical bibliography, and, of these, five offer graduate programs in medical librarianship (table 71).

The basic requirement for certification as a medical librarian is an undergraduate degree plus a master's degree from an accredited library school offering an approved course in medical bibliography. This 5-year program may be followed by an internship or other specialized training.

Several associations or institutions conduct short-term (1 week or less) courses for individuals without formal education in library science but having responsibility for library service in hospitals. Sponsors of this type of training activity include the American Hospital Association and the Catholic Hospital Association.

In addition to librarians and clerical staff, medical libraries may employ other personnel such as indexers, abstractors, translators, and specialists trained in the uses of automatic data processing in the storage and retrieval of information. No employment statistics are available on these occupations.

Patients' Librarian

Differentiated from the medical library is the patients' library which is designed to meet the reading needs of individual patients in the hospital. An estimate of the number of hospitals that have a separately administered patients' library staffed by hospital employees is not available. Often volunteers are responsible for whatever service is available to patients. In many instances the city or county public library or the State library agency has librarians on its staff who supply library services to hospital patients.

The patients' librarian, also known as the *hospital librarian*, develops library facilities to meet the interests of bedridden and ambulatory patients, provides book cart service, and stimulates reading as a part of the therapeutic program for hospitalized persons.

The basic educational requirement for a professional librarian is a master's degree in library science obtainable in any of the 39 schools accredited by the American Library Association.

REFERENCE

(*23*) The President's Commission on Heart Disease, Cancer, and Stroke: *A National Program to Conquer Heart Disease, Cancer, and Stroke: A Program for Developing Medical Libraries.* II: 380–399. Washington. U.S. Government Printing Office, February 1965.

Table 71. LOCATION AND OWNERSHIP OF SCHOOLS OF LIBRARY SCIENCE THAT OFFER SPECIAL COURSES IN MEDICAL BIBLIOGRAPHY: 1968

Location	School	Ownership
	Total, 15 schools [1]	
Calif	University of California, Los Angeles	Public.
	University of Southern California, Los Angeles	Private.
D.C	Catholic University of America, Washington	Do.
Ga	Emory University, Atlanta	Do.
Ill	University of Chicago, Chicago	Do.
	University of Illinois, Urbana	Public.
Md	University of Maryland, College Park	Do.
Mich	University of Michigan, Ann Arbor	Do.
Minn	University of Minnesota, Minneapolis	Do.
N.Y	Columbia University, New York	Private.
N.C	University of North Carolina, Chapel Hill	Public.
Ohio	Case Western Reserve University, Cleveland	Private.
Okla	University of Oklahoma, Norman	Public.
Pa	Drexel Institute of Technology, Philadelphia	Private.
	University of Pittsburgh, Pittsburgh	Do.

[1] Data not available on number of students enrolled in these courses.

Source: U.S. Department of Health, Education, and Welfare, National Library of Medicine.

CHAPTER 17

Medical Records

A medical record in a hospital or clinic is a permanent document of the history and condition of a patient's illness or injury. It is a complete compilation of medical observations and findings from the time a patient is admitted until his discharge. In 1967, almost 37,000 medical record librarians and technical and clerical workers were employed in the medical record departments of hospitals, clinics, health departments and agencies, or industrial establishments (table 72).

Medical record librarians are responsible for the coordination of all the medical and surgical information on each patient. Their duties vary greatly with the type and size of the institution where they are employed. In a small hospital additional duties may consist of serving as admitting officer or as bookkeeper or secretary to the administrator and medical staff. In a large hospital their time may be devoted primarily to planning medical record procedures and services, supervising department staff members, or the educational and research programs of the hospital.

The minimum educational requirement for professional registration as a medical record librarian is 2 years of general college work and 1 year of study in medical record science in an AMA-approved school.

Beginning in 1970, all approved schools for medical record librarians will be at the baccalaureate level and above, either incorporated into a 4-year program leading to a baccalaureate degree, or in a program of post-baccalaureate study. In 1967, 27 schools graduated 192 medical record librarians (tables 73 and 74).

The American Association of Medical Record Librarians (AAMRL) maintains a list of persons who have successfully completed the national registration examination which qualifies them to use the professional designation of Registered Record Librarian (RRL). Since 1922, a total of 6,000 such persons have been registered. An estimated 3,800 RRL's were active in the profession in 1967.

The *medical record technician* assists the medical record librarian and performs the technical tasks associated with the maintenance and use of medical records. Formal training for these technicians was started about 12 years ago. Courses usually last from 9 to 12 months in AMA–AAMRL approved hospital schools and junior colleges. Associate degree programs in junior colleges requiring 2 years of study are increasing in number. Practical instruction is given in medical terminology, anatomy, physiology and medical record procedures. A total of 93 medical record technicians were graduated from the 12 approved schools in 1966–67 (tables 75 and 76).

The correspondence course of the AAMRL—open to persons who are employed in medical record work and who are high school graduates—is another avenue to becoming a medical record technician. These who satisfactorily complete the 25-lesson course are eligible to apply to the national accreditation examination for designation ART—accredited record technician.

Since 1955, a total of 2,148 persons have successfully completed the qualification examination to become ART's—about 900 within the past 2 years. About 1,500 ART's were employed in 1967.

Table 72. ESTIMATED NUMBER OF ACTIVE MEDICAL RECORD PERSONNEL: SELECTED YEARS 1950 THROUGH 1967

Year	Medical record librarians		Other medical record personnel	
	Total	Registered record librarians (RRL's)	Total	Accredited record technicians (ART's)
1967	[1] 12, 000	3, 800	25, 000	1, 500
1965	10, 000	3, 500	23, 000	800
1960	8, 000	3, 000	20, 000	300
1955	7, 000	2, 500	15, 000	-----------
1950	4, 000	2, 000	8, 000	-----------

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[1] Includes about 2,000 employed outside of hospitals—in clinics, health departments and agencies, or industrial establishments.

Source: American Association of Medical Record Librarians and National Center for Health Statistics (revised estimates).

Table 73. SCHOOLS OFFERING APPROVED PROGRAMS FOR MEDICAL RECORD LIBRARIANS, STUDENTS, AND GRADUATES: SELECTED YEARS, 1949–50 THROUGH 1966–67

Academic year	Schools	Students [1]	Graduates [2]	Academic year	Schools	Students [1]	Graduates [2]
1966–67	27	211	[3] 192	1961–62	27	168	152
1965–66	[illegible]	214	192	1960–61	28	146	139
1964–65	29	199	180	1959–60	29	144	137
1963–64	27	174	161	1954–55	21	145	137
1962–63	[illegible]	150	142	1949–50	18	90	83

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[1] Enrollment in final year only.

[2] Graduates through August of year concerned.

[3] Includes 45 certificates (less than college level), 146 bachelor's degrees, and 1 master's degree.

Sources: American Association of Medical Record Librarians and Council on Medical Education: Education Number of the *J.A.M.A.* Chicago. American Medical Association. Annual issues. Data for United States and Puerto Rico.

Table 74. LOCATION AND OWNERSHIP OF APPROVED SCHOOLS FOR MEDICAL RECORD LIBRARIANS AND NUMBERS OF STUDENTS AND GRADUATES: 1966–67

Location	School	Ownership	Students[1]	Graduates[2]		
				Certificate	Bachelor's	Master's
	Total, 27 schools		211	45	146	1
Calif.	Loma Linda University, Loma Linda	Private	4	—	3	—
	University of California, Los Angeles	Public	9	—	8	1
D.C.	George Washington University, Washington	Private	5	—	[3] 5	—
Ga.	Emory University—Emory University Hospital, Atlanta.	do	2	—	[3] 1	—
	Medical College of Georgia—Eugene Talmadge Memorial Hospital, Augusta.	Public	11	—	11	—
Ill.	St. Elizabeth Hospital, Danville	Private	9	9	—	—
	University of Illinois College of Medicine, Chicago.	Public	6	—	5	—
Ind.	Indiana University School of Medicine, Indianapolis.	do	15	—	15	—
La.	University of Southwestern Louisiana, Lafayette Charity Hospital.	do	10	—	8	—
Md.	U.S. Public Health Service Hospital, Baltimore.	do	12	—	[3] 11	—
Mich.	Mercy College, Detroit	Private	4	—	4	—
Minn.	College of St. Scholastica, Duluth	do	16	—	13	—
Miss.	University Hospital, Jackson	Public	6	3	—	—
Mo.	Avila College, Kansas City	Private	4	—	4	—
	Homer G. Phillips Hospital, St. Louis	Public	2	2	—	—
	St. Louis University, St. Louis	Private	13	—	9	—
Nebr.	College of Saint Mary, Omaha	do	2	—	2	—
N.C.	Wake Forest College—North Carolina Baptist Hospitals, Winston-Salem.	do	5	5	—	—
Okla.	Hillcrest Medical Center, Tulsa	do	5	5	—	—
Pa.	Mount Mercy College—Mercy Hospital, Pittsburgh.	do	6	—	4	—
	University of Pennsylvania, Graduate Hospital, Philadelphia.	do	12	—	[3] 11	—
Tenn.	University of Tennessee—Baptist Memorial Hospital, Memphis.	do	8	8	—	—
Tex.	Sacred Heart Dominican College—St. Joseph's Hospital, Houston.	do	13	13	—	—
	Incarnate Word College—Santa Rosa Medical Center, San Antonio.	do	6	—	6	—
Wash.	Seattle University—Providence Hospital, Seattle.	do	11	—	11	—
Wis.	Viterbo College—St. Francis Hospital, La Crosse.	do	5	—	5	—
P.R.	University of Puerto Rico School of Medicine, San Juan.	Public	10	—	[3] 10	—

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[1] Enrollment in final year only.

[2] Number of graduates who received a certificate in medical record science (less than collegiate level), a bachelor's degree, or a master's degree.

[3] Graduates of 12-month certificate schools which require a bachelor's degree for entrance.

Source: American Association of Medical Record Librarians.

Table 75. SCHOOLS OFFERING APPROVED PROGRAMS FOR MEDICAL RECORD TECHNICIANS, STUDENTS, AND GRADUATES: SELECTED YEARS, 1954–55 THROUGH 1966–67

Academic year	Schools	Students	Graduates	Academic year	Schools	Students	Graduates
1966–67	12	118	93	1961–62	12	74	72
1965–66	15	115	105	1960–61	12	48	47
1964–65	13	77	70	1959–60	12	46	46
1963–64	14	130	98	1954–55	8	35	28
1962–63	14	95	81				

Sources: American Association of Medical Record Librarians and Council on Medical Education: Education Number of the *J.A.M.A.* Chicago. American Medical Association. Annual issues.

Table 76. LOCATION AND OWNERSHIP OF APPROVED SCHOOLS FOR MEDICAL RECORD TECHNICIANS AND NUMBERS OF STUDENTS AND GRADUATES: 1966–67

Location	Schools	Ownership	Students	Graduates
	Total, 12 schools		118	93
Calif	East Los Angeles College, Los Angeles	Public	10	10
	Fullerton Junior College, Fullerton	do	10	3
Ind	St. Margaret's Hospital, Hammond	Private	7	6
Kans	Hutchinson Junior College, Hutchinson	Public	5	5
Mass	St. Joseph's Hospital, Lowell	Private	9	8
Minn	St. Mary's Junior College, Minneapolis	do	9	9
Mo	Research Hospital, Kansas City	do	21	19
Ohio	Marymount Hospital, Garfield Heights	do	6	5
Tenn	Madison Hospital, Madison	do	[1] 7	—
Tex	Hendrick Memorial Hospital, Abilene	do	8	8
Wash	Spokane Community College, Spokane	Public	21	20
	St. Joseph Hospital, Tacoma	Private	[1] 5	—

[1] Students enrolled in the final year of a 2-year program with an affiliated junior college.

Source: American Association of Medical Record Librarians.

CHAPTER 18

Medicine and Osteopathy

The science and art of dealing with the prevention, cure, and alleviation of disease is the province of both doctors of medicine and doctors of osteopathy. As of December 31, 1967, there were 322,045 such physicians in the United States and outlying areas of whom 308,630 had the degree of Doctor of Medicine (M.D.) and 13,415 had the degree, Doctor of Osteopathy (D.O.). Both kinds of physicians diagnose diseases, treat people who are ill, and, in most States, use surgery, drugs, and all other accepted methods of medical care.

Included in this count of both types of physicians are 292,661 non-Federal physicians (excludes 1,660 with addresses unknown). Of this number, 290,420 are located in the 50 States and the District of Columbia; 2,038 in Puerto Rico; and 203 in other U.S. outlying areas (American Samoa, Canal Zone, Guam, Pacific Islands, and the Virgin Islands). In addition, there are 27,724 Federal physicians in the United States and abroad. The 2,513 non-Federal physicians temporarily in foreign locations are not included.

In the previous publication, the American Medical Association (AMA) categories for M.D. were grouped into four activity classifications: "private practice," "other practice," "training," and "retired, not in practice or status not reported." "Private practice" excluded those in internships, residencies, other full-time hospital staff, preventive medicine, research, medical school faculty, administration, laboratory medicine, and those retired or not in practice. Many physicians in the "other practice" classification (e.g., a number of those in administrative medicine preventive medicine, and pathology) were delivering patient care.

In 1967, the AMA adopted a new classification for physicians' activity—"patient care" and "other professional activity" (other professional activity includes only those physicians in teaching, administration, and research.)

"Patient care" is subdivided into "hospital-based practice" and "solo, partnership, group or other practice." "Hospital-based practice" includes physicians in training programs (interns, residents, and fellows) and full-time physician staff. "Solo, partnership, group, or other practice" includes physicians providing patient care in office settings, as well as those providing patient care in institutional settings other than hospitals.

For the years 1963–67, the following tables list data tabulated according to the new AMA classification; for years prior to 1963, data are tabulated according to the "private practice" classification. Because of this change, data prior to 1963 are not comparable to data for 1963 and later.

The total number of M.D.'s and D.O.'s per 100,000 total population remained at 149 from 1950 to 1963 and increased to 158 by 1967. The ratio of physicians providing patient care in solo, partnership, group or other office-based practice per 100,000 population has remained consistent at 100 over the last few years. The ratio of the total number of physicians providing patient care per 100,000 population has increased from 125 in 1963 to 130 in 1967 (table 77).

Almost four out of five physicians fall in the category, "patient care." The percentage of physicians in solo, group, or other practice has decreased by 2 percent since 1964. Physicians in training programs and hospital staff positions have increased slightly. Those who are reported as retired, not in medical practice, or whose status is unknown continue at 5 percent (table 78).

The ratios of all non-Federal physicians and those providing patient care per 100,000 civilians in 1967 are shown for each State in table 79. The number of active non-Federal physicians providing patient care by type of practice in 1967 for each State is shown in table 80. The Northeastern States generally have the highest ratios of physicians to population; the Southern States, the lowest.

Specialists outnumber general practitioners about three to one among the total active physicians. The 30-some specialties recognized by the profession have been grouped into five major categories in table 81. Of the 257,283 M.D.'s and D.O.'s in practice in 1967, exclusive of those in training programs, 174,125 indicated a primary specialty other than general practice. Slightly more than half of these specialists held certificates awarded by American Specialty Boards. Nineteen specialty certifying boards are affiliated with the AMA; and 12 with the American Osteopathic Association (AOA) (*24*).

A license to practice is required in all States and the District of Columbia. To qualify for a license, a candidate must be a graduate of an approved school, pass a licensing examination, and—in more than half the States—serve a 1-year hospital internship.

The 89 medical schools in the United States and Puerto Rico include 84 approved medical schools that award the M.D. degree, three approved schools of basic medical sciences from which students may transfer to one of the 84 degree-granting schools, and two schools recently established. The five osteopathic colleges award the D.O. degree to those completing the 4-year course. In 1966–67, 94 M.D. and D.O. schools enrolled 35,186 students and graduated 8,148 physicians (tables 82 and 83).

Training as a physician takes at least 7 years after graduation from high school, and often includes an additional number of years of training. Three years of college work is the minimum requirement for entry into schools of medicine and osteopathy, but 4 years is preferable. This is followed by 4 years of study leading to the M.D. or D.O. degree. After graduation, almost all doctors serve a 12-month internship in an approved hospital. Those who wish to become certified specialists must have 2 to 4 years of advanced hospital training (residency), followed by 2 or more years of supervised practice in the specialty.

Many graduates of foreign medical schools serve as interns and residents in this country. These foreign graduates—citizens of foreign countries as well as U.S. citizens—account for 29 percent of all physicians in training programs (*25*). To be appointed to approved internships or residencies in U.S. hospitals, these graduates must pass the American Qualification Examination given by the Educational Council for Foreign Medical Graduates.

"The permanent supply of physicians is presently augmented at the rate of 1,400 a year by foreign medical graduates who become fully licensed to enter practice, and by an unknown number who remain without license. In total, there are more than 40,000 foreign medical graduates in the United States, comprising 14 percent of the active physicians in the country" (*26*).

REFERENCES

(*24*) Department of Graduate Medical Education: *Directory of Approved Internships and Residencies.* Chicago. American Medical Association. 1967. pp. 312–313.

(*25*) Council on Medical Education: Education Number of the *J.A.M.A.* 202 (8): 781. Chicago. American Medical Association, November 1967. Also prior annual issues.

(*26*) *Report of the National Advisory Commission on Health Manpower,* Vol. I. U.S. Government Printing Office, November 1967.

Table 77. PHYSICIANS IN RELATION TO POPULATION: SELECTED YEARS, 1950 THROUGH 1967

Year [1]	Population in thousands	Number of physicians			Physicians per 100,000 population
		M.D. and D.O.	M.D.	D.O.	
	Total [2]	All physicians, active and inactive [3]			
1967	203, 708	322, 045	308, 630	13, 415	158
1966	201, 585	313, 559	300, 375	13, 184	156
1965	199, 278	305, 115	292, 088	13, 027	153
1964	196, 858	297, 089	284, 224	12, 865	151
1963	194, 169	289, 188	276, 475	12, 713	149
1960	185, 370	274, 834	260, 484	14, 350	148
1955	170, 499	255, 211	241, 711	13, 500	150
1950	156, 472	232, 697	219, 997	12, 700	149
	Civilians	Non-Federal physicians providing patient care [4]			
1967	199, 783	260, 296	249, 273	11, 023	130
1966	197, 662	254, 396	243, 333	11, 063	129
1965	195, 833	250, 208	239, 262	10, 946	128
1964	193, 612	244, 542	233, 772	10, 770	126
1963	190, 892	237, 673	227, 027	10, 646	125
	Civilians	Non-Federal physicians providing patient care in office-based practice [5]			
1967	199, 783	200, 146	190, 079	10, 067	100
1966	197, 662	197, 214	187, 100	10, 114	100
1965	195, 833	195, 334	185, 338	9, 996	100
1964	193, 612	192, 978	183, 076	9, 902	100
1963	190, 892	189, 267	179, 449	9, 818	99
1960	182, 349	179, 176	168, 142	11, 034	98
1955	167, 038	169, 871	159, 371	10, 500	102
1950	153, 635	168, 089	158, 189	9, 900	109

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[1] All data as of December 31.

[2] Includes civilians in 50 States, District of Columbia, Puerto Rico, and other U.S. outlying areas; U.S. citizens in foreign countries; and the Armed Forces in United States and abroad.

[3] Includes non-Federal physicians in the 50 States, District of Columbia, Puerto Rico, and other U.S. outlying areas (American Samoa, Canal Zone, Guam, Pacific Islands, and Virgin Islands); those with addresses temporarily unknown to the AMA; and Federal physicians in the United States and abroad. Excludes physicians with temporary foreign addresses.

[4] Includes those in solo, partnership, group, or other forms of office practice and those in hospital-based practice—interns, residents, fellows, and full-time hospital staff.

[5] Data for 1963–67 are for M.D.'s in solo, partnership, group, or other practice and D.O.'s in private practice. Prior to 1963 data refer to M.D.'s and D.O.'s in private practice.

Sources: AMA Department of Survey Research: *Distribution of Physicians, Hospitals, and Hospital Beds in The U.S., 1967. Regional, State, County, Metropolitan Areas.* J. N. Haug and G. A. Roback. Chicago. American Medical Association, 1968. Also prior reports.

Division of Public Health Methods, Dental Public Health and Resources, and Nursing: Manpower in the 1960's. *Health Manpower Source Book 18.* PHS Pub. No. 263, Section 18. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1964. Table 12.

Membership and Statistics Department: *A Statistical Study of the Osteopathic Profession, December 31, 1967.* Chicago. American Osteopathic Association, June 1968. Also prior editions. U.S. Bureau of the Census: Population estimates. *Current Population Reports.* Series P–25, Nos. 327, 336, 358, 361, 386, and 392.

U.S. Department of State: *Annual Report on U.S. Citizen Personnel and Their Dependents—as of March 31, 1967.* Also prior reports.

Table 78. PHYSICIANS BY TYPE OF PRACTICE: 1963–67 [1]

Type of practice	1963	1964	1965	1966	1967
All physicians	289, 188	297, 089	305, 115	313, 559	322, 045
Active physicians [2]	272, 500	280, 461	288, 671	297, 097	305, 453
Doctors of Medicine	276, 475	284, 224	292, 088	300, 375	308, 630
Non-Federal	253, 226	261, 048	268, 040	272, 891	279, 418
Patient care	227, 027	233, 772	239, 262	243, 333	249, 273
Solo, partnership, group or other practice [3]	179, 449	183, 076	185, 338	187, 100	190, 079
General practice	69, 041	67, 583	66, 377	64, 776	63, 543
Other full-time primary specialty	110, 408	115, 493	118, 961	122, 324	126, 536
Training programs [4]	35, 153	37, 473	39, 604	40, 709	42, 590
Full-time hospital staff	12, 425	13, 223	14, 320	15, 524	16, 604
Other professional activity [5]	12, 787	13, 937	15, 499	16, 346	17, 247
Inactive	13, 412	13, 339	13, 279	13, 212	12, 898
Federal	21, 914	21, 843	22, 814	26, 178	27, 552
Patient care	19, 924	19, 771	20, 156	23, 433	24, 917
Training programs [4]	3, 363	3, 535	3, 902	4, 228	4, 266
Full-time hospital staff	16, 561	16, 236	16, 254	19, 205	20, 651
Other professional activity [5]	1, 990	2, 072	2, 658	2, 745	2, 635
Address unknown	1, 335	1, 333	1, 234	1, 306	1, 660
Doctors of Osteopathy	12, 713	12, 865	13, 027	13, 184	13, 415
Non-Federal	12, 702	12, 849	13, 005	13, 155	13, 243
Patient care	10, 646	10, 770	10, 946	11, 063	11, 023
Private practice	9, 818	9, 902	9, 996	10, 114	10, 067
General practice [6]	8, 699	8, 704	8, 730	8, 764	8, 651
Other full-time primary specialty	1, 119	1, 198	1, 266	1, 350	1, 416
Training programs [4]	655	687	768	755	775
Full-time hospital staff	173	181	182	194	181
Other professional activity [5]	115	123	128	148	186
Inactive	1, 188	1, 211	1, 232	1, 263	1, 300
Status not reported	753	745	699	681	734
Federal	11	16	22	29	172

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[1] Includes non-Federal physicians in the 50 States, District of Columbia, Puerto Rico, and other U.S. outlying areas (American Samoa, Canal Zone, Guam, Pacific Islands, and Virgin Islands); those with addresses temporarily unknown to the American Medical Association; and Federal physicians in the United States and abroad. Excludes physicians with temporary foreign addresses.

[2] Excludes the categories inactive, address unknown, and status not reported.

[3] Includes physicians rendering patient care in offices and institutional settings such as industry, insurance companies, health departments, laboratories, etc.

[4] Includes interns, residents, and fellows.

[5] Includes teaching, administration, and research. In the previous publication, a classification of "other practice," had included full-time hospital staff, medical school faculty, administration, laboratory medicine, preventive medicine and research. Laboratory medicine (primarily pathologists) and preventive medicine were eliminated as activities and are now reclassified according to principal employer. Most of these are now in "patient care" categories of "solo, partnership, group, or other practice" and "hospital-based practice."

[6] Includes manipulative therapy.

Sources: AMA Department of Survey Research: *Distribution of Physicians, Hospitals, and Hospital Beds in the U.S., 1967: Regional, State, County, Metropolitan Area.* J. N. Haug and G. A. Roback. Chicago. American Medical Association, 1968. Also prior reports.

Membership and Statistics Department: *A Statistical Study of the Osteopathic Profession, December 31, 1967.* Chicago. American Osteopathic Association, June 1968. Also prior annual editions.

Table 79. LOCATION OF NON-FEDERAL PHYSICIANS IN RELATION TO POPULATION: DECEMBER 31, 1967

Location	Civilian population in thousands July 1	All non-Federal physicians [1]				M.D.'s and D.O.'s providing patient care[2]			
		M.D. and D.O.	Number		Rate per 100,000 civilians	M.D. and D..O	Number		Rate per 100,000 civilians
			M.D. only	D.O. only			M.D. only	D.O. only	
All locations	198, 649	292, 661	279, 418	13, 243	147	260, 296	249, 273	[3] 11, 023	131
United States	195, 669	290, 420	277, 177	13, 243	148	258, 279	247, 256	11, 023	132
Ala	3, 505	2, 871	2, 867	4	82	2, 621	2, 619	2	75
Alaska	238	177	173	4	74	164	162	2	69
Ariz	1, 606	2, 347	2, 068	279	146	2, 020	1, 790	230	126
Ark	1, 958	1, 710	1, 688	22	87	1, 520	1, 505	15	78
Calif	18, 793	34, 555	34, 135	420	184	30, 345	30, 204	141	161
Colo	1, 927	3, 685	3, 425	260	191	3, 237	3, 013	224	168
Conn	2, 912	5, 422	5, 367	55	186	4, 776	4, 735	41	164
Del	515	727	686	41	141	671	635	36	130
D.C	793	3, 023	3, 007	16	381	2, 521	2, 509	12	318
Fla	5, 902	9, 447	8, 841	606	160	7, 450	7, 006	444	126
Ga	4, 389	4, 558	4, 478	80	104	4, 097	4, 034	63	93
Hawaii	684	1, 002	982	20	146	913	898	15	133
Idaho	695	676	639	37	97	622	598	24	89
Ill	10, 825	14, 996	14, 652	344	139	13, 534	13, 313	221	125
Ind	4, 989	5, 158	4, 960	198	103	4, 686	4, 516	170	94
Iowa	2, 752	3, 298	2, 889	409	120	2, 896	2, 566	330	105
Kans	2, 255	2, 680	2, 483	197	119	2, 388	2, 228	160	106
Ky	3, 142	3, 168	3, 129	39	101	2, 825	2, 795	30	90
La	3, 622	4, 095	4, 083	12	113	3, 715	3, 704	11	103
Maine	958	1, 238	1, 031	207	129	1, 091	935	156	114
Md	3, 606	6, 374	6, 351	23	177	5, 481	5, 466	15	152
Mass	5, 387	11, 195	10, 913	282	208	9, 763	9, 584	179	181
Mich	8, 564	12, 643	10, 541	2, 102	148	11, 232	9, 590	1, 642	131
Minn	3, 577	5, 414	5, 351	63	151	4, 851	4, 802	49	136
Miss	2, 320	1, 768	1, 767	1	76	1, 604	1, 603	1	69
Mo	4, 565	6, 832	5, 677	1, 155	150	5, 883	5, 030	853	129
Mont	691	726	686	40	105	673	645	28	97
Nebr	1, 423	1, 717	1, 670	47	121	1, 511	1, 479	32	106
Nev	437	477	449	28	109	437	415	22	100
N.H	681	964	938	26	142	813	797	16	119
N.J	6, 947	10, 041	9, 398	643	145	9, 211	8, 688	523	133
N. Mex	985	1, 050	928	122	107	895	788	107	91
N.Y	18, 303	40, 646	40, 082	564	222	36, 500	36, 044	456	199
N.C	4, 913	5, 168	5, 136	32	105	4, 505	4, 484	21	92
N. Dak	627	585	575	10	93	544	535	9	87
Ohio	10, 437	14, 760	13, 682	1, 078	141	13, 415	12, 539	876	129
Okla	2, 447	2, 904	2, 483	421	119	2, 593	2, 240	353	106
Oreg	1, 994	2, 935	2, 766	169	147	2, 555	2, 422	133	128
Pa	11, 612	18, 728	17, 163	1, 565	161	16, 628	15, 380	1, 248	143
R.I	875	1, 433	1, 349	84	164	1, 327	1, 255	72	152
S.C	2, 526	2, 111	2, 105	6	84	1, 910	1, 906	4	76
S. Dak	667	575	538	37	86	533	503	30	80
Tenn	3, 858	4, 497	4, 431	66	117	3, 997	3, 946	51	104
Tex	10, 657	12, 571	11, 760	811	118	11, 342	10, 644	698	106
Utah	1, 020	1, 365	1, 346	19	134	1, 205	1, 188	17	118
Vt	416	790	745	45	190	621	590	31	149
Va	4, 349	5, 183	5, 147	36	119	4, 566	4, 538	28	105
Wash	3, 029	4, 725	4, 515	210	156	4, 133	3, 973	160	136

See footnotes at end of table.

Table 79. LOCATION OF NON-FEDERAL PHYSICIANS IN RELATION TO POPULATION: DECEMBER 31, 1967—Continued

Location	Civilian population in thousands July 1	All non-Federal physicians[1]				M.D.'s and D.O.'s providing patient care[2]			
		M.D. and D.O.	Number		Rate per 100,000 civilians	M.D. and D.O.	Number		Rate per 100,000 civilians
			M.D. only	D.O. only			M.D. only	D.O. only	
W. Va.	1, 797	1, 870	1, 756	114	104	1, 690	1, 590	100	94
Wisc	4, 185	5, 218	5, 037	181	125	4, 697	4, 539	158	112
Wyo	311	322	309	13	104	297	288	9	95
P.R.	2, 684	2, 038	2, 038	—	76	1, 836	1, 836	—	68
U.S. outlying areas	296	203	203	—	69	181	181	—	61

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[1] Excludes 27,724 Federal physicians (27,552 M.D.'s and 172 D.O.'s) and 1,660 with addresses temporarily unknown to the AMA. Includes 14,198 inactive physicians (12,898 M.D.'s and 1,300 D.O.'s).

[2] M.D.'s include those in solo, partnership, group or other practice and those in training programs and in hospital-based practice; D.O.'s include those in private practice and those in training programs and professional full-time hospital positions. Excludes 30,145 non-Federal M.D.'s (11,166 on medical school faculties; 2,729 in administration; 3,352 in research; and 12,898 in inactive status), and 1,660 with addresses temporarily unknown to the AMA; and 1,486 non-Federal D.O.'s (17 in full-time administrative hospital positions; 127 on college faculties; 42 in miscellaneous activities; and 1,300 in inactive status) and 734 whose status was not reported to the AOA.

[3] Total includes 775 D.O.'s in training programs for whom distribution by State is unavailable.

Sources: AMA Department of Survey Research: *Distribution of Physicians, Hospitals, and Hospital Beds in the U.S., 1967: Regional, State, County, Metropolitan Area.* J. N. Haug and G. A. Roback. Chicago. American Medical Association, 1968.
Membership and Statistics Department: *A Statistical Study of the Osteopathic Profession, December 31, 1967*. Chicago. American Osteopathic Association. (June 1968.)
U.S. Bureau of the Census: Population Estimates. *Current Population Reports*. Series P-25, No. 380, November 1967 and No. 392, May 1968.

Table 80. LOCATION OF ACTIVE NON-FEDERAL PHYSICIANS PROVIDING PATIENT CARE BY TYPE OF PRACTICE: DECEMBER 31, 1967

Location	Number of M.D.'s[1]					Number of D.O.'s[2]		
	Total	Solo, partnership, group, or other practice	Hospital-based practice			Total	Private practice	Hospital staff
			Interns	Residents and fellows	Full-time physician staff			
All locations	249, 273	190, 079	9, 868	32, 722	16, 604	[3] 11, 023	10, 067	181
United States	247, 256	188, 772	9, 813	32, 517	16, 154	11, 023	10, 067	181
Ala	2, 619	2, 217	91	218	93	2	2	—
Alaska	162	154	—	—	8	2	2	—
Ariz	1, 790	1, 528	81	115	66	230	225	5
Ark	1, 505	1, 306	30	112	57	15	15	—
Calif	30, 204	25, 120	984	2, 579	1, 521	141	141	—
Colo	3, 013	2, 258	154	459	142	224	222	2
Conn	4, 735	3, 468	215	652	400	41	41	—
Del	635	496	11	54	74	36	36	—
D.C	2, 509	1, 524	159	602	224	12	12	—
Fla	7, 006	5, 641	219	738	408	444	437	7
Ga	4, 034	3, 165	176	502	191	63	63	—
Hawaii	898	751	34	61	52	15	15	—
Idaho	598	580	—	—	18	24	24	—

See footnotes at end of table.

Table 80. LOCATION OF ACTIVE NON-FEDERAL PHYSICIANS PROVIDING PATIENT CARE BY TYPE OF PRACTICE: DECEMBER 31, 1967—Continued

Location	Number of M.D.'s[1]					Number of D.O.'s[2]		
	Total	Solo, partnership, group, or other practice	Hospital-based practice			Total	Private practice	Hospital staff
			Interns	Residents and fellows	Full-time physician staff			
Ill.	13,313	10,004	674	1,731	904	221	212	9
Ind.	4,516	3,916	113	292	195	170	166	4
Iowa	2,566	2,078	77	304	107	330	326	4
Kans.	2,228	1,744	50	286	148	160	160	—
Ky.	2,795	2,277	78	279	161	30	30	—
La.	3,704	2,859	173	499	173	11	11	—
Maine	935	817	12	29	77	156	151	5
Md.	5,466	3,433	303	1,181	549	15	15	—
Mass.	9,584	6,422	377	1,798	987	179	178	1
Mich.	9,590	6,726	392	1,722	750	1,642	1,590	52
Minn.	4,802	3,369	165	996	272	49	49	—
Miss.	1,603	1,410	20	116	57	1	1	—
Mo.	5,030	3,584	221	883	342	853	829	24
Mont.	645	628	—	—	17	28	28	—
Nebr.	1,479	1,254	56	115	54	32	32	—
Nev.	415	392	—	—	23	22	22	—
N.H.	797	686	19	51	41	16	16	—
N.J.	8,688	7,027	364	691	606	523	514	9
N. Mex.	788	690	21	46	31	107	107	—
N.Y.	36,044	24,471	1,706	6,453	3,414	456	455	1
N.C.	4,484	3,489	149	632	214	21	21	—
N. Dak.	535	495	1	11	28	9	9	—
Ohio	12,539	9,200	610	1,965	764	876	862	14
Okla.	2,240	1,890	68	207	75	353	352	1
Oreg.	2,422	2,041	79	219	83	133	133	—
Pa.	15,380	11,303	741	2,225	1,111	1,248	1,221	27
R.I.	1,255	964	51	116	124	72	70	2
S.C.	1,906	1,640	48	144	74	4	4	—
S. Dak.	503	467	12	9	15	30	30	—
Tenn.	3,946	2,996	202	551	197	51	51	—
Tex.	10,644	8,860	304	1,068	412	698	689	9
Utah	1,188	935	64	153	36	17	17	—
Vt.	590	428	28	94	40	31	31	—
Va.	4,538	3,564	159	543	272	28	28	—
Wash.	3,973	3,281	124	379	189	160	160	—
W. Va.	1,590	1,289	39	142	120	100	99	1
Wisc.	4,539	3,656	159	495	229	158	154	4
Wyo.	288	279	—	—	9	9	9	—
P.R.	1,836	1,247	39	185	365	—	—	—
U.S. outlying areas	181	60	16	20	85	—	—	—

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[1] Excludes 27,552 Federal M.D.'s and 30,145 non-Federal M.D.'s in other professional activities or inactive status; and 1,660 with addresses temporarily unknown to the AMA.

[2] Excludes 172 Federal D.O.'s and 1,486 non-Federal D.O.'s in other professional activities or inactive status; and 734 with status not reported to the A.O.A.

[3] Total includes 775 D.O.'s in training programs for whom distribution by State is unavailable.

Sources: A.M.A. Department of Survey Research: *Distribution of Physicians, Hospitals, and Hospital Beds in the U.S., 1967: Regional, State, County, Metropolitan Area.* J. N. Haug and G. A. Roback. Chicago, American Medical Association, 1968.

Membership and Statistics Department: *A Statistical Study of the Osteopathic Profession, December 31, 1967.* Chicago. American Osteopathic Association, June 1968. Also unpublished data from AOA.

Table 81. TYPE OF PRACTICE AND PRIMARY SPECIALTY OF PHYSICIAN: 1967

Primary specialty	Number of physicians (M.D.)					Number of D.O.'s in private practice [1]
	Total active	Patient care			Other professional activity	
		Solo, partnership, group, or other practice	Hospital-based practice			
			Training programs	Full-time physician staff		
All specialties	[2] 294, 072	190, 079	46, 856	37, 255	19, 882	10, 067
General practice [3]	83, 293	63, 543	8, 786	7, 080	3, 884	[4] 8, 651
Medical specialties	68, 927	40, 113	12, 498	9, 571	6, 745	354
Allergy	962	872	26	34	30	2
Cardiovascular disease	2, 263	1, 162	421	324	356	2
Dermatology	3, 796	2, 807	510	260	219	20
Gastroenterology	749	408	135	106	100	—
Internal medicine	42, 325	23, 952	8, 055	6, 205	4, 113	266
Pediatrics [5]	17, 614	10, 466	3, 281	2, 118	1, 749	64
Pulmonary diseases	1, 218	446	70	524	178	—
Surgical specialties	91, 822	63, 317	16, 409	8, 764	3, 332	841
Anesthesiology	9, 630	6, 681	1, 296	1, 164	489	180
Colon and rectal surgery	644	610	17	12	5	43
General surgery	29, 687	18, 365	6, 989	3, 309	1, 024	273
Neurological surgery	2, 315	1, 390	502	243	180	5
Obstetrics and gynecology	17, 964	13, 125	2, 667	1, 499	673	80
Ophthalmology	9, 083	7, 048	1, 247	540	248	[6] 133
Orthopedic surgery	8, 426	5, 853	1, 557	807	209	73
Otolaryngology	5, 583	4, 239	807	382	155	23
Plastic surgery	1, 303	948	220	98	37	1
Thoracic surgery	1, 725	1, 093	228	254	150	5
Urology	5, 462	3, 965	879	456	162	25
Psychiatry and neurology	23, 295	10, 809	4, 491	5, 432	2, 563	31
Child psychiatry	1, 080	475	255	201	149	—
Neurology	2, 466	912	611	444	499	3
Psychiatry	19, 749	9, 422	3, 625	4, 787	1, 915	28
Other specialties [7]	26, 735	12, 297	4, 672	6, 408	3, 358	190
Aviation medicine	792	87	64	459	182	—
General preventive medicine	1, 007	395	61	171	380	—
Occupational medicine	1, 706	1, 416	17	100	173	3
Pathology [8]	9, 518	2, 783	2, 222	3, 086	1, 427	46
Physical medicine and rehabilitation	1, 208	386	234	413	175	9
Public health	1, 627	984	51	158	434	—
Radiology [9]	10, 877	6, 246	2, 023	2, 021	587	132

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[1] Data not available on specialties for 775 in training programs; 181 in full-time hospital staff positions; and 186 in other professional activities; and 172 Federal D.O.'s. Excludes all inactive D.O.'s and those with status not reported.

[2] Includes non-Federal M.D.'s in the 50 States, District of Columbia, Puerto Rico, and other U.S. outlying areas (American Samoa, Canal Zone, Guam, Pacific Islands, and Virgin Islands); and Federal M.D.'s in the U.S. and abroad. Excludes all inactive M.D.'s, those with addresses unknown, and those with temporary foreign addresses.

[3] Includes no specialty and other specialties not recognized.

[4] Includes 827 with practice limited to manipulative therapy.

[5] Includes pediatric allergy and pediatric cardiology.

[6] Includes specialty combination of ophthalmology and otolaryngology, and ophthalmology and otorhinolaryngology.

[7] In 1966, the American Medical Association eliminated the specialty "Administrative Medicine." Those physicians previously classified in "Administrative Medicine" have been reclassified according to their secondary specialty.

[8] Includes forensic pathology.

[9] Includes diagnostic radiology and therapeutic radiology.

Sources: AMA Department of Survey Research: *Distribution of Physicians, Hospitals, and Hospital Beds in the U.S., 1967. Regional, State, County, Metropolitan Area.* J. N. Haug and G. A. Roback. Chicago. American Medical Association, 1968.

Membership and Statistics Department: *A Statistical Study of the Osteopathic Profession, December 31, 1967.* Chicago. American Osteopathic Association. June 1968.

Table 82. LOCATION AND OWNERSHIP OF MEDICAL AND OSTEOPATHIC SCHOOLS AND NUMBERS OF STUDENTS AND GRADUATES: 1966–67

Location	School	Ownership	Students	Graduates
	Total, 94 schools		35, 186	8, 148
	4-year medical schools			
Ala.	Medical College of Alabama, Birmingham	Public	312	74
Ark.	University of Arkansas School of Medicine, Little Rock	do	370	87
Calif.	Loma Linda University School of Medicine, Loma Linda, Los Angeles.	Private	339	88
	Stanford University School of Medicine, Palo Alto	do	306	48
	University of California-California College of Medicine, Los Angeles.	Public	318	87
	University of California School of Medicine, Los Angeles.	do	299	68
	University of California School of Medicine, San Francisco.	do	489	101
	University of Southern California School of Medicine, Los Angeles.	Private	279	71
Colo.	University of Colorado School of Medicine, Denver	Public	340	84
Conn.	Yale University School of Medicine, New Haven	Private	320	73
D.C.	Georgetown University School of Medicine, Washington	do	449	106
	George Washington University School of Medicine, Washington.	do	405	96
	Howard University College of Medicine, Washington	do	401	98
Fla.	University of Florida College of Medicine, Gainesville	Public	236	59
	University of Miami School of Medicine, Coral Gables	Private	312	69
Ga.	Emory University School of Medicine, Emory University, Atlanta.	do	280	64
	Medical College of Georgia, Augusta	Public	383	92
Ill.	Chicago Medical School, Chicago	Private	282	66
	Northwestern University Medical School, Chicago	do	536	136
	Stritch School of Medicine of Loyola University, Chicago.	do	338	76
	University of Chicago School of Medicine, Chicago	do	280	71
	University of Illinois College of Medicine, Chicago	Public	765	179
Ind.	Indiana University School of Medicine, Indianapolis	do	818	182
Iowa	University of Iowa College of Medicine, Iowa City	do	487	114
Kans.	University of Kansas School of Medicine, Kansas City	do	446	103
Ky.	University of Kentucky College of Medicine, Lexington	do	276	60
	University of Louisville School of Medicine, Louisville	Private	363	84
La.	Louisiana State University School of Medicine, New Orleans.	Public	516	125
	Tulane University School of Medicine, New Orleans	Private	510	128
Md.	Johns Hopkins University School of Medicine, Baltimore.	do	366	89
	University of Maryland School of Medicine, Baltimore	Public	486	107
Mass.	Boston University School of Medicine, Boston	Private	286	62
	Harvard Medical School, Boston	do	536	150
	Tufts University School of Medicine, Boston	do	445	108
Mich.	University of Michigan Medical School, Ann Arbor	Public	780	182
	Wayne State University School of Medicine, Detroit	do	516	98
Minn.	University of Minnesota Medical School, Minneapolis	do	643	156
Miss.	University of Mississippi School of Medicine, Jackson	do	298	68
Mo.	Saint Louis University School of Medicine, St. Louis	Private	439	97
	University of Missouri School of Medicine, Columbia	Public	326	76
	Washington University School of Medicine, St. Louis	Private	329	76

Table 82. LOCATION AND OWNERSHIP OF MEDICAL AND OSTEOPATHIC SCHOOLS AND NUMBERS OF STUDENTS AND GRADUATES: 1966–67—Continued

Location	School	Ownership	Students	Graduates
	4-year medical schools—Continued			
Nebr.	Creighton University School of Medicine, Omaha	Private	283	69
	University of Nebraska College of Medicine, Omaha	Public	339	75
N.J.	New Jersey College of Medicine and Dentistry, Jersey City.	do.	303	66
N.Y.	Albany Medical College of Union University, Albany	Private	249	56
	Albert Einstein College of Medicine of Yeshiva University, New York.	do.	388	91
	Columbia University College of Physicians and Surgeons, New York.	do.	472	116
	Cornell University Medical College, New York	do.	338	83
	New York Medical College, New York	do.	494	117
	New York University School of Medicine, New York	do.	478	117
	State University of New York at Buffalo School of Medicine, Buffalo.	Public	387	95
	State University of New York, Downstate Medical Center, Brooklyn.	do.	754	160
	State University of New York, Upstate Medical Center, Syracuse.	do.	391	93
	University of Rochester School of Medicine and Dentistry, New York.	Private	275	66
N.C.	Bowman Gray School of Medicine of Wake Forest College, Winston-Salem.	do.	214	51
	Duke University School of Medicine, Durham	do.	323	80
	University of North Carolina School of Medicine, Chapel Hill.	Public	284	74
Ohio	Ohio State University College of Medicine, Columbus	do.	581	136
	University of Cincinnati College of Medicine, Cincinnati.	do.	388	90
	Western Reserve University School of Medicine, Cleveland.	Private	351	82
Okla.	University of Oklahoma School of Medicine, Oklahoma City.	Public	399	89
Oreg.	University of Oregon Medical School, Portland	do.	336	80
Pa.	Hahnemann Medical College of Philadelphia, Philadelphia.	Private	427	104
	Jefferson Medical College of Philadelphia, Philadelphia.	do.	663	161
	Temple University School of Medicine, Philadelphia	do.	551	129
	University of Pennsylvania School of Medicine, Philadelphia.	do.	502	122
	University of Pittsburgh School of Medicine, Pittsburgh.	do.	381	82
	Woman's Medical College of Pennsylvania, Philadelphia.	do.	204	37
S.C.	Medical College of South Carolina, Charleston	Public	308	80
Tenn.	Meharry Medical College, Nashville	Private	234	50
	University of Tennessee College of Medicine, Memphis.	Public	672	150
	Vanderbilt University School of Medicine, Nashville	Private	206	48
Tex.	Baylor University College of Medicine, Houston	do.	344	79
	University of Texas Medical Branch, Galveston	Public	591	150
	University of Texas Southwestern Medical School, Dallas.	do.	401	96
Utah	University of Utah College of Medicine, Salt Lake City.	do.	237	52
Vt.	University of Vermont College of Medicine, Burlington.	do.	195	46

Table 82. LOCATION AND OWNERSHIP OF MEDICAL AND OSTEOPATHIC SCHOOLS AND NUMBERS OF STUDENTS AND GRADUATES: 1966–67—Continued

Location	School	Ownership	Students	Graduates
	4-year medical schools—Continued			
Va.	Medical College of Virginia, Richmond	Public	375	78
	University of Virginia School of Medicine, Charlottesville.	do.	295	69
Wash.	University of Washington School of Medicine, Seattle	do.	315	79
W. Va.	West Virginia University School of Medicine, Morgantown.	do.	231	53
Wisc.	Marquette University School of Medicine, Milwaukee	Private	394	98
	University of Wisconsin Medical School, Madison	Public	395	92
P.R.	University of Puerto Rico School of Medicine, San Juan	do.	215	44
	Approved schools of basic medical sciences			
N.H.	Dartmouth Medical School, Hanover	Private	94	----------
N. Dak.	University of North Dakota School of Medicine, Grand Forks.	Public	91	----------
S. Dak.	State University of South Dakota School of Medicine, Vermillion.	do.	88	----------
	Developing medical schools—operational			
N. Mex.	University of New Mexico School of Medicine, Albuquerque (not yet eligible for approval).	do.	66	--------
N.J.	Rutgers, The State University, New Brunswick	do.	16	----------
	4-year osteopathic schools			
Ill.	Chicago College of Osteopathy, Chicago	Private	272	56
Iowa	College of Osteopathic Medicine and Surgery, Des Moines.	do.	317	68
Mo.	Kansas City College of Osteopathy and Surgery, Kansas City.	do.	414	97
	Kirksville College of Osteopathy and Surgery, Kirksville.	do.	395	101
Pa.	Philadelphia College of Osteopathic Medicine, Philadelphia.	do.	365	83

Sources: Council on Medical Education: Education Number of the *J.A.M.A.* 202(8). Chicago. American Medical Association, November 1967.
Mills, [illegible] W.: *Educational Supplement.* 19(1). Chicago. Office of Education. American Osteopathic Association, January 1967.

Table 83. MEDICAL AND OSTEOPATHIC SCHOOLS, STUDENTS, AND GRADUATES: SELECTED YEARS, 1949-50 THROUGH 1966-67

Academic year	Medicine			Osteopathy		
	Schools	Students	Graduates	Schools	Students	Graduates
1966-67	89	33, 423	7, 743	5	1, 763	405
1965-66	88	32, 835	7, 574	5	1, 681	360
1964-65	88	32, 428	7, 409	5	1, 661	395
1963-64	87	32, 001	7, 336	5	1, 594	354
1962-63	87	31, 491	7, 264	5	1, 581	362
1961-62	87	31, 078	7, 168	5	1, 555	362
1960-61	86	30, 288	6, 994	6	1, 944	506
1959-60	85	30, 084	7, 081	6	1, 915	427
1954-55	81	28, 583	6, 977	6	1, 867	459
1949-50	79	25, 103	5, 553	6	1, 778	373

Sources: Council on Medical Education: Education Number of the *J.A.M.A.* 202(8). Chicago. American Medical Association, Nov. 20, 1967. Also prior annual issues.

Mills, L. W.: *Educational Supplement*. 19(1). Chicago. Office of Education. American Osteopathic Association, Jan. 1967. Also prior annual issues.

Data for United States and Puerto Rico.

CHAPTER 19

Midwifery

Midwifery, or obstetrics, involves assistance to women during pregnancy, labor, delivery, and the postnatal period. Births in the United States are attended by three basic groups of physicians: obstetricians, general practitioners, and house staffs of hospitals. (See table 81, ch. 18.) In addition there are approximately 1,000 trained nurse-midwives (*27*) in the United States, most of whom are actively engaged in this health profession and 4,700 lay midwives who provide assistance to women during the maternity cycle. (See ch. 35 for obstetrical aides.)

In 1966, 47,000 live births or 1.3 percent of the total for the United States were reported on the birth certificate as attended by midwives. The proportion has declined from 10.7 percent in 1935 to 4.5 percent in 1950, 2.9 percent in 1955, and 2.0 percent in 1960 (*28*). Comparative data on the number of midwives in the United States and outlying areas for selected years are shown in table 84.

The *nurse-midwife* is a registered nurse (R.N.) who has successfully completed a recognized program of study and clinical experience leading to a certificate in nurse-midwifery. She is prepared to provide prenatal, intrapartum and postpartum care geared to the individual needs of each mother and family. She cares for the mother during pregnancy and stays with her in labor, providing continuous physical and emotional support. She evaluates progress and manages the labor and delivery, always watchful for signs requiring medical attention. She evaluates and provides immediate care for the newborn. She helps the mother to care for herself and for her infant; to adjust the home situation to the new child; and to lay a healthful foundation for future pregnancies. The nurse-midwife is prepared to teach, interpret and provide support as an integral part of her service. The American nurse-midwife always functions within the framework of a medically directed health service (*29*).

Although the number of births attended by nurse-midwives since 1963 has almost doubled (*27*) the actual number is not identifiable since the attendant category on the birth certificate lists only midwife.

Studies (*27*) by the Research Committee on the American College of Nurse-Midwives show that the majority of nurse-midwives are located in the eastern half of the country. Licensure laws for nurse-midwives exist in the State of New Mexico and the city of New York. In other States nurse-midwives function under the lay midwives licensure.

In contrast to the lay midwife, the nurse-midwife functions as a member of the obstetrical team in medical centers, institutions, and universities with active programs of nurse-midwifery (*29*), (*30*). The number of nurse-midwives had almost doubled during each successive 10-year period since 1935 whereas the number of lay midwives has shown a steady decline (*30*), (*31*).

The *lay midwife* provides assistance to women during childbirth in the absence of a medical practitioner. She is usually a woman with limited education who learns largely through apprenticeship. She generally serves in low economic or rural areas, and the delivery of the baby usually occurs in the home.

Twenty-three States and the District of Columbia have licensing or registration laws for lay midwives. In others, permits to practice are issued annually in an attempt to keep them under supervision. Unlicensed midwives generally practice under the supervision of State health department public health personnel. Under the direction of the State health department, public health nurses and others may hold classes to instruct them in the selection of materials and simple procedures.

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(27) American College of Nurse-Midwifery: *Descriptive data, Nurse-Midwives—USA*. New York, April 1968.

(28) National Center for Health Statistics: *Vital Statistics of the United States, 1964*. Vol. I. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1966. Also prior annual editions.

(29) Definition-American College of Nurse-Midwifery, 1954.

(30) American Medical Association: *Today's Health*. Chicago, February 1968.

(31) Thomas, M. W.: *The Practice of Nurse-Midwifery in the United States*. Bureau Pub. No. 436–1965. Public Health Service, U.S. Department of Health, Education, and Welfare, Washington. U.S. Government Printing Office, 1965.

TABLE 84. LOCATION OF MIDWIVES: SELECTED STATES AND YEARS, 1948 THROUGH 1967.

State	1948	1955 or 1956	1964	1967
Total, all locations			6, 690	5, 240
United States	20, 700	11, 500	6, 011	4, 744
Alabama	1, 701	1, 316	713	590
Arizona	(1)	50	14	11
Arkansas	1, 137	473	263	214
Connecticut	(1)	(1)	5	1
Delaware	(1)	(1)	3	2
Florida	455	336	189	154
Georgia	1, 560	977	340	270
Hawaii	(1)	(1)	5	3
Indiana	(1)	(1)	2	2
Kentucky	1, 200	604	287	32
Louisiana	1, 229	473	198	148
Maryland	160	71	32	18
Mississippi	2, 261	1, 300	811	672
Missouri	46	(2)	38	26
New Jersey	161	(2)	6	1
New Mexico	268	192	88	57
New York	(1)	(1)	------	39
North Carolina	869	486	147	83
Ohio	450	(2)	------	------
Oklahoma	185	(2)	------	------
Pennsylvania	268	172	74	66
South Carolina	1, 513	1, 028	525	354
Tennessee	1, 278	624	232	200
Texas	3, 262	(2)	1, 500	1, 500
Virginia	2, 000	820	485	273
West Virginia	194	119	54	28
Other States and D.C.	503	250	------	------
Guam			2	1
Puerto Rico			661	472
Virgin Islands			16	23

[1] Included in "other States and D.C."

[2] An estimated 2,209 midwives were practicing in these States in 1955 or 1956.

Sources: Jacobson, P. H.: Hospital care and the vanishing midwife. *Milbank Mem. Fund Quart.* 34(3): 256–257, July 1956. Data for 1948.

U.S. Department of Health, Education, and Welfare, Social and Rehabilitation Service, Children's Bureau. Unpublished data for 1955–56, 1964 and 1967.

CHAPTER 20

Nursing and Related Services *

Nursing services which contribute to the health and well-being of people are provided today by a wide variety of practitioners. The registered nurse may be complemented and supplemented by other types of nursing personnel whose duties and competencies are carefully delineated.

The several categories of personnel considered in this section are shown below, with recent estimates of the numbers of persons employed at the beginning of 1968:

Occupation:	*Number employed*
Registered nurses	659, 000
Practical nurses	320, 000
Nursing aides, orderlies, attendants	800, 000
Home health aides-homemakers	12, 000

Not included, since they receive on-the-job training in relation to the activities delegated to them are *ward clerks*, sometimes called *floor clerks*, who act as receptionists and also relieve the nurse of much of the paper work in the patient-care units of an institution.

Registered Nurses

Individuals in this profession may function in a variety of positions within different employment settings. They render nursing care to patients or perform specialized duties in hospitals, infirmaries, nursing homes, sanatoriums, clinics, doctors' offices, industrial plants, schools, or in patients' homes through a public health department or other service agency. They also serve as teachers of nursing. *Registered nurses*—or *graduate nurses*—are responsible for the nature and quality of all nursing care that patients receive. They are also responsible for carrying out the physicians' instructions and for supervising practical nurses and other nonprofessional personnel who perform routine care and treatment of patients.

Registered nurses in practice in the United States numbered about 659,000 as of January 1, 1968, an increase of 19,000 over the previous year, according to the Interagency Conference on Nursing Statistics. National estimates of employed nurses for each biennium since 1954 have been compiled from various sources by the Interagency Conference on Nursing Statistics, composed of representatives from the American Nurses' Association, the National League for Nursing, the U.S. Public Health Service, and other agencies. Between 1950 and 1968, the number of employed registered nurses increased by 284,000. The effect, however, was not as great as it appeared to be since the number of part-time nurses increased at a more rapid rate than those working full time (table 85).

About two-thirds of the employed registered nurses work in hospital nursing services, not including the self-employed, private-duty nurses (table 86). Some of these hospital nurses specialize in clinical areas such as obstetrics, pediatrics, or psychiatry. Public health, school, and industrial nurses comprise 10 percent of the total.

A total of 909,131 licensed registered nurses were included in the 1966 Inventory conducted by the American Nurses' Association through the cooperation of the State boards of nursing which are the official licensing agencies for nurses (*32*). Included in this total were 593,694 persons actively employed in nursing, 285,791 not employed in nursing, and 29,646 for whom activity status was not reported (table 87).

A license to practice registered nursing is required in all States, the District of Columbia, Guam, Puerto Rico, and the Virgin Islands (*33*). For licensure as a registered nurse (R.N.), an applicant must have graduated from a school approved by the State board of nursing and passed a State board examination.

Graduation from high school is required for admission to all schools of nursing. There are three alternative initial programs of nursing education which prepare R.N.'s. Diploma programs are conducted by hospital schools, and usually require 3 years of training; associate degree programs in community colleges are approximately 2 years in length; baccalaureate programs usually require 4 years of study in a college or university, although a few require 5 years (*34*). In October 1967, 1,262 schools offered 1,269 programs in which 141,948 students were enrolled. The 1966–67 graduates totaled 38,237, of whom 72 percent were graduated from diploma programs. A phenomenal increase has occurred in graduations from associate degree programs—from 252 in 1955–56 to 4,654 in 1966–67. The number of baccalaureates has increased to 6,131 from 3,156 in 1955–56 (tables 88 and 89).

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* The material for this chapter was provided by the Public Health Service, Division of Nursing, Manpower Analysis and Resources Branch—Dr. Eugene Levine, Chief.

In addition to the degrees earned in the initial baccalaureate programs, 2,262 baccalaureates, 1,534 master's degrees, and 19 doctorates in nursing were awarded in 1967 to graduate nurses who had interrupted their practice to continue their education, either full time or part time, in colleges and universities.

The American Nurses' Association, with 200,000 members, is the professional organization for registered nurses.

Practical Nurses

Practical nurses, also known as *vocational nurses*, provide nursing care and treatment of patients under the supervision of a registered nurse. They are expected to utilize appropriate and safe nursing techniques in providing such treatments as drainage, irrigation, catheterization, routine medication if permitted by the institution, and in taking and recording temperature, pulse, respiration, and blood pressure. They may also assist with the supervision of nursing aides, orderlies, and attendants.

Practical nurses employed in the United States numbered about 320,000 as of January 1, 1968, an increase of 20,000 over the previous year, according to the Public Health Service Division of Nursing estimates. The growth in employment has been rapid, increasing from the census enumerations of 137,500 in 1950 and 206,000 in 1960 to the present 320,000 (tables 90 and 91).

The majority of practical nurses work in hospitals, clinics, homes for the aged, and nursing homes. In 1966 an estimated 151,000 were employed in AHA registered hospitals. Many others are employed in private homes. Most of the remainder work in doctors' offices, schools, and public health agencies. In 1966, 904 licensed practical nurses were employed in public health work under the supervision of public health staff nurses (*33*).

Since 1960, licensure of practical nurses has been provided for by law in the 50 States, the District of Columbia, Guam, Puerto Rico, Samoa, and the Virgin Islands. For licensure as a licensed practical nurse (L.P.N.), or licensed vocational nurse (L.V.N.) in California and Texas, an applicant must now graduate from a State-approved school of practical nursing and pass a State board examination. Licensure by waiver of the educational requirements is no longer permitted in most States.

Requirements for admission to a practical nursing school program vary. In most States the applicants are required to have completed at least 2 years of high school; a few States require a high school diploma. The training usually lasts 12 to 18 months and may be obtained in trade, technical, or vocational schools operated by public school systems or in private schools controlled by hospitals, health agencies, or colleges. As of October 15, 1967, 1,149 programs of practical nursing education were approved by the State agencies (*35*). Reports from 1,130 programs indicated 41,269 admissions and 27,644 graduates in 1966–67 (tables 92 and 93).

The National Federation of Licensed Practical Nurses, with 28,000 members, is the association for individuals in this health field.

Nursing Aides, Orderlies, and Attendants

Auxiliary nursing workers in hospitals and nursing homes function as assistants to nurses in providing many services related to the comfort and welfare of patients. *Nursing aides*, usually women, assist registered and practical nurses by performing less skilled tasks in the care of patients. *Orderlies* and *attendants*, usually men, assist by performing a variety of duties for male patients and certain heavy duties in the care of the physically ill, mentally ill, and mentally retarded.

Based on data from the American Hospital Association, the number of attendants in hospitals and other institutions rose from 221,000 persons employed in 1950 to 375,000 persons in 1960. In 1966, a survey by the American Hospital Association indicated that almost 500,000 aides, orderlies, and attendants were employed in hospitals, including as many as 18,000 surgical technical aides, and 137,000 persons working as *psychiatric aides* in mental institutions (table 94).

The total number of aides, orderlies, and attendants employed in 1968 was estimated at 800,000 by the U.S. Public Health Service Division of Nursing.

Although there are no definite educational requirements, on-the-job training programs provided by hospitals and clinics may include classroom instruction, demonstration, and practice taught by a registered nurse. The training programs may cover several months, depending on the hospital.

Psychiatric aides are licensed in three States—Arkansas, California, and Michigan.

There is no national association that identifies individuals employed as aides, orderlies, and attendants.

Home Health Aides and Homemakers

Home health aides—also called *homes aides* or *visiting health aides*—give supportive services which are required to provide and maintain normal bodily and emotional comfort and to assist the patient toward independent living in a safe environment. The services are given under the supervision of a nurse, or, when appropriate, of a physical, speech, or occupational therapist. The home health aide may help the patient with his bath and with the care of mouth, skin, and hair; getting in and out of bed; getting to the bathroom or using a bedpan; with prescribed exercises; to relearn household skills; with eating and preparing meals; and with medications that are ordinarily self-administered. She may perform those household services which will facilitate the patient's health care at home and are necessary to prevent or postpone institutionalization. Most *homemakers* also provide these services, although some provide care and assistance to families and individuals in times of stress resulting from problems other than illness.

The total number of home health aides and homemakers has increased from about 500 employed in 1950, to 2,300 in 1960 and over 12,000 in 1968. More than 800 home health aide and homemaker service programs are in public and voluntary agencies now operating in 50 States, the District of Columbia, and Puerto Rico (*36*).

Home health aides are often recruited from persons who have had little formal education and no health training. The employing agency is responsible for on-the-job training, with a nurse providing the basic and on-going training in personal care services, and with other health personnel involved in their appropriate aspects. A State license is not required for persons providing homemaker services.

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(*33*) Division of Nursing: *Nurses in Public Health, January 1966*. PHS Pub. No. 785. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1967.

(*34*) National League for Nursing: *State Approved Schools of Nursing—R.N.* New York, 1968. Published annually.

(*35*) National League for Nursing: *State Approved Schools of Nursing—LPN/LVN.* New York, 1968. Published annually.

(*36*) Doscher, V. R.: *Report of the 1964 National Conference on Homemaker Services.* New York. National Council for Homemaker Services, 1964. Also correspondence with the Council which is the organization for agencies that provide homemaker services.

Table 85. REGISTERED NURSES IN RELATION TO POPULATION: SELECTED YEARS 1950 THROUGH 1968

Year	Resident population in thousands	Number of nurses in practice			Nurses per 100,000 population
		Total	Full time	Part time	
1968 [1]	199, 017	659, 000			331
1967 [1]	196, 858	640, 000			325
1966 [1]	194, 899	621, 000			319
1964 [1]	190, 169	582, 000	450, 000	132, 000	306
1962 [1]	184, 598	550, 000	433, 000	117, 000	298
1960 [1]	178, 729	504, 000	414, 000	90, 000	282
1958	171, 922	460, 000			268
1956	165, 931	430, 000			259
1954	159, 825	401, 600			251
1950	150, 697	375, 000	335, 000	40, 000	249

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[1] In 50 States and the District of Columbia.

Sources: Interagency Conference on Nursing Statistics for 1954–68 estimates; U.S. Bureau of the Census for 1950 data on nurses (adjusted).
U.S. Bureau of the Census: Population estimates. *Current Population Reports.* Series P–25, No. 361, February 1967, and No. 389, March 1968.

Table 86. FIELD OF EMPLOYMENT OF REGISTERED NURSES: JANUARY 1, 1967

Field of employment	Number of nurses	Percent of total	Field of employment	Number of nurses	Percent of total
Total	640, 000	100. 0	Occupational health	19, 500	3. 0
			Nursing education	24, 000	3. 8
Hospitals, nursing homes, and related institutions	431, 000	67. 3	Private practice, office and other fields	124, 000	19. 4
Public health and school	41, 500	6. 5			

Source: U.S. Public Health Service, Division of Nursing, 1967.

Table 87. LOCATION OF REGISTERED NURSES (R.N.'s) EMPLOYED OR RESIDENT BY ACTIVITY STATUS: 1966

Location	Number of nurses			
	Total	Employed in nursing	Not employed in nursing	Activity status not reported
United States	909, 131	593, 694	285, 791	29, 646
Alabama	8, 239	5, 685	2, 237	317
Alaska	873	581	279	13
Arizona	8, 257	5, 775	2, 360	122
Arkansas	3, 690	2, 569	1, 064	57
California	93, 649	57, 537	34, 266	1, 846
Colorado	10, 964	8, 208	2, 619	137
Connecticut	20, 393	14, 973	4, 805	615
Delaware	3, 300	2, 043	1, 170	87
District of Columbia	4, 382	3, 604	709	69
Florida	28, 760	21, 007	6, 757	996
Georgia	10, 115	6, 851	3, 111	153
Hawaii	3, 084	2, 193	704	187
Idaho	3, 049	1, 946	1, 090	13
Illinois	54, 777	33, 331	18, 024	3, 422
Indiana	17, 999	12, 307	4, 959	733
Iowa	14, 990	9, 956	4, 996	38
Kansas	10, 532	6, 558	3, 459	515
Kentucky	9, 048	6, 130	2, 678	240
Louisiana	9, 180	6, 598	2, 364	218
Maine	6, 410	3, 963	2, 308	139
Maryland	15, 250	9, 840	5, 158	252
Massachusetts	45, 731	25, 729	15, 207	4, 795
Michigan	37, 515	22, 005	13, 212	2, 298
Minnesota	18, 434	14, 184	3, 922	328
Mississippi	4, 663	3, 553	961	149
Missouri	14, 566	11, 021	3, 197	348
Montana	3, 404	2, 471	916	17
Nebraska	7, 308	4, 674	2, 547	87
Nevada	1, 533	1, 052	470	11
New Hampshire	5, 402	3, 381	1, 806	215
New Jersey	42, 479	24, 283	17, 074	1, 122
New Mexico	3, 619	2, 482	1, 095	42
New York	110, 495	72, 456	35, 326	2, 713
North Carolina	15, 627	12, 038	3, 475	114
North Dakota	2, 889	2, 095	768	26
Ohio	45, 572	32, 239	12, 761	572
Oklahoma	6, 582	4, 435	1, 842	305
Oregon	9, 303	6, 647	2, 428	228
Pennsylvania	75, 353	43, 382	27, 978	3, 993
Rhode Island	5, 322	3, 617	1, 624	81
South Carolina	7, 635	5, 367	1, 918	350
South Dakota	2, 907	2, 055	804	48
Tennessee	9, 427	6, 628	2, 622	177
Texas	30, 468	19, 491	9, 955	1, 022
Utah	3, 531	2, 329	1, 175	27
Vermont	2, 813	1, 796	955	62
Virginia	16, 508	11, 461	4, 976	71
Washington	17, 850	11, 259	6, 430	161
West Virginia	6, 010	4, 687	1, 298	25
Wisconsin	17, 623	14, 018	3, 522	83
Wyoming	1, 621	1, 204	410	7

Source: American Nurses Association: ***Facts About Nursing; A Statistical Summary.*** **New York, 1968.**

Table 88. SCHOOLS OF NURSING—R.N. STUDENTS AND GRADUATES: 1955–56 THROUGH 1967–68

Academic year	Schools	Students [1]	Graduates			
			Total	Diploma	Associate degree	Bachelor's degree
1967–68	1, 262	141, 948				
1966–67	1, 219	139, 070	38, 237	27, 452	4, 654	6, 131
1965–66	1, 191	135, 702	35, 125	26, 278	3, 349	5, 498
1964–65	1, 153	129, 269	34, 686	26, 795	2, 510	5, 381
1963–64	1, 142	124, 744	35, 259	28, 238	1, 962	5, 059
1962–63	1, 128	123, 861	32, 398	26, 438	1, 479	4, 481
1961–62	1, 118	123, 012	31, 186	25, 727	1, 159	4, 300
1960–61	1, 123	118, 849	30, 267	25, 311	917	4, 039
1959–60	1, 119	115, 057	30, 113	25, 188	789	4, 136
1958–59	1, 126	113, 518	30, 312	25, 907	462	3, 943
1957–58	1, 118	112, 989	30, 410	26, 314	425	3, 671
1956–57	1, 115	114, 674	29, 933	26, 141	276	3, 516
1955–56	1, 125	114, 423	30, 236	26, 828	252	3, 156

[1] Fall enrollment at beginning of academic year.

Sources: American Nurses' Association: *Facts About Nursing; A Statistical Summary*. New York, 1967. Published annually. Data for United States and Puerto Rico.

National League for Nursing: *State-approved Schools of Nursing—R.N.* New York. The League, 1968. Published annually. 1966 and 1967 enrollments include United States, Puerto Rico, Guam, and the Virgin Islands.

Table 89. LOCATION OF SCHOOLS OF NURSING—R.N., AND NUMBERS OF STUDENTS AND GRADUATES: 1967

Location	Schools	Students [1]	Graduates [2]			
			Total	Diploma	Associate degree	Bachelor's degree
All locations	1, 262	141, 948	38, 237	27, 452	4, 654	6, 131
United States	1, 247	140, 631	37, 931	27, 170	4, 639	6, 122
Alabama	16	1, 508	333	259	9	65
Arizona	8	1, 232	193	80	60	53
Arkansas	6	517	130	115	—	15
California	73	8, 292	2, 065	571	938	556
Colorado	12	1, 439	277	141	37	99
Connecticut	20	2, 701	795	665	14	116
Delaware	6	462	70	56	—	14
District of Columbia	6	875	230	142	—	88
Florida	25	2, 710	809	295	328	186
Georgia	23	2, 221	672	571	37	64
Hawaii	2	258	93	46	19	28
Idaho	5	292	65	12	42	11
Illinois	75	7, 659	2, 336	2, 025	107	204
Indiana	29	3, 431	973	631	148	194
Iowa	22	2, 551	714	594	16	104
Kansas	20	1, 501	518	423	7	88
Kentucky	23	1, 659	472	291	98	83
Louisiana	15	1, 995	353	205	16	132

See footnotes at end of table.

Table 89. LOCATION OF SCHOOLS OF NURSING—R.N., AND NUMBERS OF STUDENTS AND GRADUATES: 1967—Continued

Location	Schools	Students[1]	Graduates[2]			
			Total	Diploma	Associate degree	Bachelor's degree
Maine	7	688	189	163	15	11
Maryland	28	3, 134	773	595	28	150
Massachusetts	58	7, 550	2, 146	1, 773	147	226
Michigan	40	5, 666	1, 463	925	259	279
Minnesota	27	3, 917	1, 176	738	175	263
Mississippi	17	843	207	68	115	24
Missouri	32	3, 655	939	716	71	152
Montana	6	690	159	75	29	55
Nebraska	14	1, 818	484	414	—	70
Nevada	2	223	39	—	27	12
New Hampshire	10	763	222	201	—	21
New Jersey	43	4, 243	1, 294	1, 201	66	27
New Mexico	3	291	32	11	—	21
New York	137	16, 771	4, 727	3, 126	917	684
North Carolina	38	3, 330	793	535	99	159
North Dakota	10	914	274	216	—	58
Ohio	65	8, 459	2, 562	2, 174	98	290
Oklahoma	12	812	276	213	25	38
Oregon	6	1, 102	276	180	—	96
Pennsylvania	111	13, 719	3, 847	3, 589	98	160
Rhode Island	8	1, 191	278	234	—	44
South Carolina	9	1, 102	315	159	125	31
South Dakota	11	1, 128	246	171	19	56
Tennessee	22	2, 036	480	368	37	75
Texas	41	4, 084	859	509	85	265
Utah	7	662	204	41	80	83
Vermont	5	571	113	60	25	28
Virginia	31	2, 643	633	482	28	123
Washington	19	2, 279	541	208	116	217
West Virginia	16	1, 248	367	271	53	43
Wisconsin	25	3, 650	897	632	26	239
Wyoming	1	146	22	—	—	22
Guam	1	37	—	—	—	—
Puerto Rico	13	1, 251	306	282	15	9
Virgin Islands	1	29	—	—	—	—

[1] As of Oct. 15, 1967.

[2] Academic Year 1966–67.

Source: National League for Nursing: *State-Approved Schools of Nursing—R.N.* New York, 1968. Published annually.

Table 90. PRACTICAL NURSES IN RELATION TO POPULATION: SELECTED YEARS, 1950 THROUGH 1967

Year	Resident population in thousands	Number of nurses in practice		Nurses per 100,000 population
		Total	In A.H.A. registered hospitals	
1968	199, 017	320, 000	---------	161
1967	196, 858	300, 000	---------	152
1966	194, 899	282, 000	151, 000	145
1964	190, 169	250, 000	128, 800	131
1962	184, 598	225, 000	126, 825	122
1960	179, 323	206, 000	---------	115
1950	151, 326	137, 500	49, 800	91

Sources: U.S. Public Health Service, Division of Nursing's estimates of practical nurses employed 1962–68. U.S. Bureau of the Census data for 1950 and 1960.

U.S. Bureau of the Census: Population estimates. *Current Population Reports.* Series P–25, No. 361, February 1967, and No. 389, March 1968.

Table 91. LOCATION OF ACTIVE PRACTICAL NURSES IN RELATION TO POPULATION: 1960

Location	Resident population in thousands	Number of nurses[1]	Nurses per 100,000 population
United States	179, 323	205, 974	115
Alabama	3, 267	3, 617	111
Alaska	226	118	52
Arizona	1, 302	1, 205	93
Arkansas	1, 786	2, 010	113
California	15, 717	18, 619	118
Colorado	1, 754	2, 603	148
Connecticut	2, 535	2, 800	110
Delaware	446	471	106
District of Columbia	764	1, 749	229
Florida	4, 952	5, 046	102
Georgia	3, 943	4, 613	117
Hawaii	633	952	150
Idaho	667	1, 017	152
Illinois	10, 081	8, 440	84
Indiana	4, 662	3, 896	84
Iowa	2, 758	2, 863	104
Kansas	2, 179	2, 527	116
Kentucky	3, 038	2, 775	91
Louisiana	3, 257	3, 521	108
Maine	969	1, 548	160
Maryland	3, 101	2, 847	92
Massachusetts	5, 149	11, 339	220
Michigan	7, 823	11, 864	152
Minnesota	3, 414	3, 948	116
Mississippi	2, 178	2, 592	119
Missouri	4, 320	5, 862	136
Montana	675	742	110
Nebraska	1, 411	1, 895	134
Nevada	285	242	85
New Hampshire	607	922	152
New Jersey	6, 067	4, 870	80
New Mexico	951	770	81
New York	16, 782	15, 191	91
North Carolina	4, 556	3, 967	87
North Dakota	632	522	83
Ohio	9, 706	11, 615	120
Oklahoma	2, 328	3, 838	165
Oregon	1, 769	2, 656	150
Pennsylvania	11, 319	13, 125	116
Rhode Island	859	1, 118	130
South Carolina	2, 383	1, 610	68
South Dakota	681	605	89
Tennessee	3, 567	4, 381	123
Texas	9, 580	13, 386	140
Utah	891	801	90
Vermont	390	679	174
Virginia	3, 967	3, 960	100
Washington	2, 853	4, 597	161
West Virginia	1, 860	1, 892	102
Wisconsin	3, 952	3, 503	89
Wyoming	330	245	74

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[1] Census data on employed practical nurses—the latest available by State.

Source: U.S. Bureau of the Census: *U.S. Census of Population: 1960. Detailed Characteristics: United States Summary.* Series PC(1)–1D to 52D. Washington. U.S. Government Printing Office, 1963.

Table 92. PROGRAMS OF PRACTICAL NURSE TRAINING, ADMISSIONS AND GRADUATES: 1953–54 THROUGH 1966–67

Academic Year	Approved programs	Reporting programs	Admissions	Graduates	Academic Year	Approved programs	Reporting programs	Admissions	Graduates
1966–67	[1] 1, 174	1, 130	41, 269	27, 644	1959–60	661	632	23, 060	16, 491
1965–66	1, 081	1, 018	38, 755	25, 688	1958–59	607	595	23, 116	14, 573
1964–65	984	941	36, 489	24, 331	1957–58	520	511	20, 531	12, 407
1963–64	913	881	34, 131	22, 761	1956–57	439	422	16, 843	10, 666
1962–63	851	810	30, 585	19, 621	1955–56	396	396	15, 526	10, 641
1961–62	739	707	26, 660	18, 106	1954–55	395	361	15, 440	9, 694
1960–61	693	660	24, 995	16, 635	1953–54	296	290	12, 075	7, 109

[1] Includes 25 programs which closed during the year, some of which reported.

Sources: American Nurses' Association: *Facts About Nursing: A Statistical Summary*. New York, 1967. Also prior annual editions. Data for United States, Puerto Rico, and other U.S. outlying areas.
National League of Nursing: *State-Approved Schools of Nursing—L.P.N./L.V.N.* New York, 1968.

Table 93. LOCATION OF PROGRAMS OF PRACTICAL NURSING AND NUMBERS OF ADMISSIONS AND GRADUATES: 1966–67

Location	Approved programs reporting	Admissions	Graduates	Location	Approved programs reporting	Admissions	Graduates
All locations	1, 130	41, 269	27, 644	Montana	6	104	84
				Nebraska	4	316	244
United States	1, 116	40, 749	27, 342	Nevada	8	148	74
				New Hampshire	4	147	108
Alabama	28	856	580	New Jersey	31	980	747
Alaska	1	54	13	New Mexico	7	258	131
Arizona	10	448	184	New York	104	4, 217	2, 758
Arkansas	18	594	384	North Carolina	35	919	628
California	66	2, 907	1, 861	North Dakota	3	246	185
Colorado	12	427	300	Ohio	35	1, 898	1, 306
Connecticut	9	679	379	Oklahoma	14	379	293
Delaware	4	105	62	Oregon	12	284	224
District of Columbia	4	167	132	Pennsylvania	49	2, 170	1, 403
Florida	23	1, 135	742	Rhode Island	3	192	122
Georgia	39	1, 267	609	South Carolina	21	331	218
Hawaii	3	95	80	South Dakota	3	143	108
Idaho	18	159	127	Tennessee	11	1, 099	721
Illinois	36	2, 039	1, 356	Texas	148	3, 513	2, 366
Indiana	16	617	471	Utah	3	91	59
Iowa	23	665	571	Vermont	1	10	19
Kansas	11	425	325	Virginia	43	986	664
Kentucky	14	634	294	Washington	24	976	694
Louisiana	23	786	416	West Virginia	17	512	286
Maine	4	143	128	Wisconsin	11	720	528
Maryland	21	436	245	Wyoming	2	51	18
Massachusetts	37	1, 375	957				
Michigan	31	1, 908	1, 534	American Somoa	1	20	7
Minnesota	29	846	791	Puerto Rico	11	487	279
Mississippi	15	401	250	Virgin Islands	2	13	16
Missouri	22	891	563				

Source: National League for Nursing: *State-Approved Schools of Nursing—L.P.N./L.V.N.* New York, 1968. Published annually.

Table 94. LOCATION OF AIDES, ORDERLIES, AND ATTENDANTS EMPLOYED IN HOSPITALS IN RELATION TO POPULATION: 1966

Location	Number employed	Rate per 100,000 population [1]
United States	[1]492, 007	251. 1
Alabama	6, 846	195. 0
Alaska	802	302. 6
Arizona	2, 850	177. 8
Arkansas	3, 086	157. 8
California	46, 216	245. 8
Colorado	5, 494	281. 0
Connecticut	7, 096	246. 6
Delaware	1, 187	231. 4
District of Columbia	3, 958	491. 1
Florida	12, 393	210. 3
Georgia	7, 196	161. 9
Hawaii	637	87. 6
Idaho	788	113. 1
Illinois	32, 808	304. 2
Indiana	14, 458	292. 0
Iowa	7, 910	286. 6
Kansas	7, 568	332. 7
Kentucky	7, 332	230. 5
Louisiana	8, 013	221. 5
Maine	2, 340	239. 3
Maryland	9, 655	267. 4
Massachusetts	14, 536	269. 0
Michigan	21, 644	255. 6
Minnesota	9, 988	279. 6
Mississippi	4, 133	176. 9
Missouri	12, 539	274. 7
Montana	2, 103	299. 6
Nebraska	5, 200	361. 4
Nevada	628	145. 7
New Hampshire	1, 754	259. 5
New Jersey	13, 988	202. 8
New Mexico	2, 375	237. 0
New York	66, 203	363. 7
North Carolina	9, 371	188. 4
North Dakota	2, 248	349. 6
Ohio	22, 444	216. 6
Oklahoma	6, 551	264. 5
Oregon	4, 605	233. 4
Pennsylvania	24, 860	214. 3
Rhode Island	2, 622	292. 0
South Carolina	4, 683	180. 9
South Dakota	1, 971	290. 3
Tennessee	5, 814	150. 4
Texas	20, 335	189. 2
Utah	1, 600	158. 9
Vermont	948	230. 7
Virginia	10, 806	242. 0
Washington	4, 542	149. 4
West Virginia	4, 774	263. 9
Wisconsin	12, 180	292. 3
Wyoming	1, 073	336. 4

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[1] Based on projection for all listed hospitals. Adjusted to allow for underreporting.

Sources: U.S. Department of Health, Education, and Welfare, Public Health Service, Bureau of Health Manpower and the American Hospital Association: *Manpower Resources in Hospitals—1966*. Chicago. American Hospital Association, 1967.

U.S. Bureau of the Census: Population estimates. *Estimates of the Population of States, by Age 1960 to 1966*. Series P-25, No. 384, Feb. 1968.

CHAPTER 21

Occupational Therapy

Occupational therapy is the use of purposeful activity as treatment in the rehabilitation of persons with physical or emotional disability. The occupational therapist, as a vital member of the rehabilitation team, determines the objectives of the treatment program according to the individual needs of each patient. This may include decreasing disability during the patient's initial phases of recovery following injury or illness, increasing the individual's capability for independence and improving his physical, emotional, and social well-being, and developing his total function to a maximum level through early evaluation and experimentation for future job training and employment.

The number of persons employed as *occupational therapists* increased from about 2,000 in 1950 to more than 6,500 in 1967. There were 8,300 registered occupational therapists in 1967. Of these, an estimated 2,000 were not in practice (table 95). About two-thirds of the occupational therapists work in hospitals, with large numbers in Federal installations. Others are employed in rehabilitation centers, nursing homes and homes for the aged, schools and camps for handicapped children, and teaching and research institutions.

Thirty-two colleges and universities offer programs leading to professional qualification in occupational therapy under three plans of education: 32 have a minimum 4-year bachelor's degree course for high school graduates and transfer students, nine have a minimum 1-year certificate course for students who hold a bachelor's degree in other than occupational therapy, and three have a 2-year graduate program leading to a master's degree for students with bachelor's degrees and the requisite background. Six colleges and universities have developed curriculums which are awaiting accreditation in 1968 or 1969. In the fall of 1967 a total of 696 seniors and postbaccalaureate students were enrolled in their final academic year and 469 students were enrolled in clinical practice. During the calendar year 1967, 534 were graduated as occupational therapists and the number is expected to increase to 590 in 1968 (tables 96 and 97).

In addition to the academic work, a minimum of 6 months of supervised clinical practice in health facilities or agencies is required to complete professional education and to qualify for admission to the national examination conducted by the American Occupational Therapy Association for professional registration.

The occupational therapist may have the help of an *occupational therapy technician*—usually known as an *occupational therapy assistant*—in carrying out the program of rehabilitating patients in hospitals and other health care facilities. The assistant's duties include direct participation in the patient's activities. It is estimated that there are between 4,500 and 5,500 occupational therapy assistants currently employed.

Nineteen occupational therapy assistant training programs for high school graduates were in operation at the close of 1967 (table 98). They are conducted by hospitals, health agencies, vocational and adult education schools and community colleges. Graduates are eligible for certification as occupational therapy assistants and for membership in the American Occupational Therapy Association. As of December 31, 1967, certified occupational therapy assistants in good standing included 729 graduates of such programs and 403 who were qualified under a terminated "grandfather clause."

Trained volunteers also play an important part in occupational therapy services. Professional artists, musicians, and others lend their abilities and special talents to assist the therapist in providing a well-rounded program for patients.

Table 95. LOCATION OF REGISTERED OCCUPATIONAL THERAPISTS: 1966

Location [1]	Number of OTR's
All locations	[2]7,728
United States	7,490
Alabama	28
Alaska	10
Arizona	51
Arkansas	18
California	1,190
Colorado	186
Connecticut	150
Delaware	29
District of Columbia	69
Florida	141
Georgia	46
Hawaii	88
Idaho	12
Illinois	430
Indiana	126
Iowa	77
Kansas	111
Kentucky	47
Louisiana	36
Maine	30
Maryland	187
Massachusetts	312
Michigan	486
Minnesota	280
Mississippi	16
Missouri	147
Montana	16
Nebraska	41
Nevada	10
New Hampshire	52
New Jersey	234
New Mexico	24
New York	807
North Carolina	67
North Dakota	30
Ohio	288
Oklahoma	30
Oregon	73
Pennsylvania	357
Rhode Island	19
South Carolina	19
South Dakota	20
Tennessee	37
Texas	235
Utah	18
Vermont	14
Virginia	170
Washington	193
West Virginia	21
Wisconsin	406
Wyoming	6
Puerto Rico	47
Armed Forces overseas	59
Foreign	132

[1] Based on mailing addresses of living registered occupational therapists.

[2] Probably 2,000 or more are currently not in practice based on the 1965 AOTA membership.

Source: American Occupational Therapy Association.

Table 96. SCHOOLS OFFERING ACCREDITED COURSES IN OCCUPATIONAL THERAPY, STUDENTS AND GRADUATES: 1960–67

Year	Schools	Seniors and postbaccalaureate students [1]	Students in clinical practice [2]	Graduates [3]
1967	32	696	469	534
1966	32	615	476	485
1965	32	602	438	505
1964	32	537	491	438
1963	32	578	407	364
1962	31	501	332	302
1961	31	439	270	367
1960	31	372	329	391

[1] October enrollment of undergraduate students in 4th year of O.T. degree program and 5th year for students with degree in other than O.T.

[2] October enrollment in internship following 4th year for degree students and 5th year for post-degree students.

[3] Calendar year data are for graduates with at least 4 years of academic education and a period of clinical practice which qualified them for professional registration upon successful completion of the national examination conducted by the American Occupational Therapy Association.

Source: American Occupational Therapy Association.

Table 97. LOCATION AND OWNERSHIP OF SCHOOLS OFFERING ACCREDITED COURSES IN OCCUPATIONAL THERAPY AND NUMBERS OF STUDENTS AND GRADUATES: 1967

Location	School	Ownership	Seniors and post-baccalaureate students [1]	Students in clinical practice [2]	Graduates [3]
	Total, 32 schools		696	469	534
Calif.	Loma Linda University, Loma Linda	Private	6	9	3
	San Jose State College, San Jose	Public	71	33	35
	University of Southern California, Los Angeles	Private	21	12	20
Colo.	Colorado State University, Fort Collins	Public	43	22	29
Fla.	University of Florida, College of Health Related Professions, Gainesville.	do.	24	20	18
Ill.	University of Illinois College of Medicine, Chicago	do.	—	33	14
Ind.	Indiana University, School of Medicine, Indianapolis.	do.	14	—	24
Iowa	University of Iowa, Iowa City	do.	20	10	10
Kans.	University of Kansas, Kansas City-Lawrence	do.	23	6	21
Mass.	Boston University, Sargent College, Boston	Private	27	14	9
	Tufts University, Boston School of Occupational Therapy, Boston.	do.	9	31	28
Mich.	Eastern Michigan University, Ypsilanti	Public	24	15	10
	Wayne State University, School of Medicine, Detroit	do.	25	16	19
	Western Michigan University, Kalamazoo	do.	46	21	29
Minn.	College of St. Catherine, St. Paul	Private	23	10	16
	University of Minnesota, School of Medical Science, Minneapolis.	Public	20	—	24
Mo.	Washington University, School of Medicine, St. Louis.	Private	10	—	12
N.H.	University of New Hampshire, Durham	Public	16	20	15
N.Y.	Columbia University, College of Physicians and Surgeons, New York.	Private	31	22	25
	New York University, School of Education, New York.	do.	20	13	13
	State University of New York, SUNY at Buffalo, Buffalo.	Public	19	13	12
N. Dak.	University of North Dakota, Grand Forks	do.	11	8	3
Ohio	Ohio State University, College of Medicine, Columbus.	do.	28	13	19
Pa.	University of Pennsylvania, School of Allied Medical Professions, Philadelphia School of Occupational Therapy, Philadelphia.	Private	24	20	13
Tex.	Texas Woman's University, Denton	Public	25	23	21
Va.	Richmond Professional Institute, School of Occupational Therapy, Richmond.	do.	35	25	15
Wash.	University of Puget Sound, School of Occupational Therapy, Tacoma.	Private	19	12	16
	University of Washington, School of Medicine, Seattle.	Public	9	8	11
Wis.	Lawrence University, Appleton [4]	Private	—	1	4
	Mount Mary College, Milwaukee	do.	18	21	18
	University of Wisconsin, Madison	Public	25	15	13
P.R.	University of Puerto Rico, School of Medicine, School of Physical and Occupational Therapy, Rio Piedras.	do.	10	3	15

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[1] October 1967 enrollment of undergraduate students in 4th year of O.T. degree program and 5th year for students with degree in other than O.T.

[2] October 1967 enrollment in internship following 4th year for degree students and 5th year for post-degree students.

[3] Calendar year 1967 data on graduates with at least 4 years of academic education and a period of clinical practice which qualifies them for professional registration upon successful completion of the national examination conducted by the American Occupational Therapy Association.

[4] Program being phased out.

Source: American Occupational Therapy Association.

Table 98. LOCATION AND OWNERSHIP OF TRAINING PROGRAMS FOR OCCUPATIONAL THERAPY ASSISTANTS, TYPE OF PROGRAM, AND NUMBER OF GRADUATES: 1967

Location	Sponsoring agency or institution [1]	Ownership	Type of program	Graduates
	Total, 19 programs			207
Colo	Colorado State Hospital, Pueblo	Public	Psychiatry	10
Conn	Hartford Hospital, Department of Psychiatry, Occupational Assistant Training Program, Hartford.[2]	Private	Combined program, all areas.	—
Md	Maryland State Department of Health, Program for Occupational Therapy Assistants, Baltimore.	Public	do	19
Mass	Massachusetts Department of Mental Health, Boston State Hospital, Boston.	do	Psychiatry	10
Minn	Occupational Therapy Assistants School, Board of Education of the City of Duluth.	do	General practice	21
	St. Mary's Junior College, Minneapolis [2]	Private	Combined program, all areas	15
N.Y	Erie County Technical Institute, Buffalo [2]	Public	do	—
	Marcy State Hospital, Marcy	do	Psychiatry	12
	New York Medical College Center for Chronic Disease, Bird S. Coler Hospital, New York.	do	Combined program, all areas	17
	Rockland State Hospital, Orangeburg	do	Psychiatry	11
Ohio	Department of Adult Education, Public Schools, Columbus.[2]	do	Combined program, all areas	—
Oreg	Mount Hood Community College, Gresham.[2]	do	do	—
Pa	Mount Aloysius Junior College, Cresson	Private	General practice	9
Tenn	Adult Vocational Education, City Schools, Murfreesboro.[2]	Public	Combined program, all areas	11
Va	Virginia Program for Occupational Therapy Assistants, Center for Continuing Education, Richmond Professional Institute, Richmond.	do	do	8
Wash	Green River Community College, Auburn [2]	do	do	—
Wis	Madison Vocational, Technical, and Adult Schools, Madison.[2]	do	do	—
	Wisconsin Board of Health, Madison	do	General practice	33
	Wisconsin Department of Mental Hygiene, Madison.	do	Psychiatry	31

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[1] Programs endorsed by American Occupational Therapy Association.

[2] Surveyed in spring of 1968, awaiting approval.

Source: American Occupational Therapy Association.

CHAPTER 22

Orthotic and Prosthetic Technology

Orthopedic and prosthetic appliance makers fabricate and fit artificial limb substitutes to replace those lost or disabled through injury or disease. On the basis of a surgeon's or other physician's prescription, the *prosthetist* makes and fits artificial limbs, while the *orthotist* makes and fits orthopedic braces. The physical therapist and occupational therapist train the patient in the use and care of his new equipment and the prosthetist and/or orthotist assist with this training. The individual who designs and fits the appliance may be certified in both prosthetics and orthotics.

The Social and Rehabilitation Service of the Department of Health, Education, and Welfare estimates that 3,500 persons were working in 1967 as prosthetists and/or orthotists. Included in this figure are 1,220 who have been certified by the American Board of Certification in Orthotics and Prosthetics. The membership of the American Orthotics and Prosthetics Association included 500 persons at the close of 1967.

Persons in this field are employed in privately owned facilities, rehabilitation centers, hospitals, or are employed by a Government agency such as the Veterans' Administration. In 1967, 164 orthotists and prosthetists were employed by the VA. In the larger establishments prosthetists and/or orthotists design and fit the prosthetic and orthotic appliances, which are fabricated by technical personnel under their supervision.

Orthotists and prosthetists have in the past been trained generally by the apprenticeship method. This type of training requires 4 years of on-the-job training under the supervision of a Board-certified prosthetist-orthotist. Completion of this course, passing the Board Examination, and recommendation by at least three physicians (two of whom must be orthopedic surgeons) are requirements for subsequent certification as a prosthetist and/or orthotist.

Recently, courses of study in prosthetics and orthotics have been initiated in university and junior college programs. New York University offers a 4-year course of study leading to a Bachelor of Science degree. Two junior colleges—Cerritos in Los Angeles and Chicago City College—offer a 2-year associate degree program in prosthetics. In addition, Delgado Junior College in New Orleans is initiating a 1-year technical program in prosthetics and orthotics to train aides in these fields.

CHAPTER 23

Pharmacy

Pharmacy is the health profession which is concerned with the preparation and distribution of medicinal products and entails a comprehensive knowledge of the physical nature, chemical composition, pharmacological action, and therapeutic use of the substances being employed.

About 122,400 pharmacists were in practice as of January 1967. This estimate is based on State registrations as reported by the individual State boards to the National Association of Boards of Pharmacy. The American Pharmaceutical Association has 34,000 active members.

The *pharmacist* practices in community, pharmacies, and institutional pharmacies. Others are employed in academic, association, government, and industry settings. The pharmacist understands the composition and properties of drugs, their manufacture and uses, their pharmacologic actions, and the procedures for testing their purity and strength. He is prepared to compound and dispense prescription orders written by physicians, dentists, and other qualified prescribers.

The pharmacist is also an increasingly important source for prescribers of information about drugs, their availablity, and activity. He also provides advice and consultation to individuals concerning the use of nonprescription medications for self-treatment at home. In addition, he serves the public directly by making available health and sickroom appliances and devices, and health information.

Many pharmacists in community pharmacies have managerial duties in addition to their professional functions. Pharmacists in hospitals may also advise the medical staff on the selection and effects of drugs, make sterile solutions, buy medical supplies, teach in schools of nursing, and perform administrative duties. Pharmacists working for drug manufacturers and wholesalers may inform doctors and dentists about new drugs, distribute medicines to other pharmacists, or supervise the manufacture of pharmaceuticals. Others teach in colleges, conduct research, develop new drugs, write for pharmaceutical journals, or perform administrative work.

There were 132,900 pharmacists licensed to practice as of January 1, 1967. More than 122,000 of these pharmacists are active. Many pharmacists register in one or more States—some register in as many as nine States. Multiple registrations increase the number of licenses to 172,635 (table 99).

The number of practicing pharmacists in the United States was about 101,100 in 1950 and has increased by about 21,000 in the interval since then. However, the rate in relation to population has declined from 67 per 100,000 civilians in 1950 to 62 in 1967.

About 98,000 or 86 percent of the pharmacists who were active as of January 1, 1967, practiced in community pharmacies. Approximately 7,000 pharmacists practiced in hospitals (table 100). However, according to a recent survey published in the June 3, 1968, issue of the American Druggist, there were 13,000 pharmacists practicing full or part time in hospitals and related institutions such as nursing homes. A number of those who practice part time were community pharmacists providing services to small hospitals and nursing homes. Those employed by pharmaceutical manufacturers and wholesalers accounted for 4,500. The remainder were employed in colleges of pharmacy, government, and other activities.

A minimum of 5 years of study after graduation from high school is required for a Bachelor of Science (B.S. in Pharm.) or a Bachelor of Pharmacy (B. Pharm.) degree from a college of pharmacy. Some colleges of pharmacy offer a program of 6 years of undergraduate study and confer the degree of Doctor of Pharmacy (Pharm. D.). This includes the additional requirement by most schools of a year or two of preprofessional education taken in approved colleges and universities. Students who do advanced study in one of the specialized areas of pharmacy may qualify for the Master of Science and/or Doctor of Philosophy degree.

In 1966–67, 75 colleges of pharmacy in the United States and Puerto Rico offered degrees in the profession. Reports from 74 schools indicated that 13,068 students were enrolled in the last three classes of academic training in the fall of 1966 and 3,744 were graduated during 1966–67 (tables 101 and 102).

A license to practice pharmacy is required in all States and the District of Columbia. To obtain a license, one must be graduated from an accredited college of pharmacy, spend a period of internship (6 months to 1 year) in all States except four and pass an examination given by the State board of pharmacy. A license obtained in one State is valid through a reciprocity agreement in most States. The profession is sponsoring continuing education programs—either required or voluntary—to assure the continued proficiency of its practitioners.

Pharmacy aides who work under the direct supervision of the pharmacist are employed in some large hospital pharmacies as well as some community pharmacies. No formal programs exist for their training. In 1966, approximately 5,600 pharmacy helpers were employed in hospitals.

Persons engaged in the manufacture, storage, distribution, and sales of medicinal products and therapeutic devices are not considered in this chapter.

Table 99. LOCATION OF LICENSED PHARMACISTS ACCORDING TO RESIDENCE AND ACTIVITY STATUS AND RATIO OF PHARMACISTS TO POPULATION: JAN. 1, 1967

Location	Total number of licenses	Pharmacists resident in State			Pharmacists out of State	Active pharmacists per 100,000 population [1]
		Total	Active in practice	Not in practice		
Total	172, 635	[2] 132, 900	122, 421	10, 479	39, 735	61. 6
Ala.	2, 242	1, 751	1, 613	138	491	45. 9
Alaska	177	86	86	------------	91	32. 4
Ariz.	2, 313	1, 164	992	172	1, 149	61. 9
Ark.	1, 609	1, 149	946	203	460	48. 4
Calif.	12, 600	11, 790	10, 720	1, 070	810	57. 0
Colo.	3, 042	1, 862	1, 616	246	1, 180	82. 7
Conn.	3, 094	2, 575	2, 498	77	519	86. 8
Del.	443	258	234	24	185	45. 6
D.C.	1, 805	954	862	92	851	106. 9
Fla.	5, 828	4, 805	4, 697	108	1, 023	79. 7
Ga.	3, 432	2, 651	2, 405	246	781	54. 1
Hawaii	250	200	200	------------	50	27. 6
Idaho	1, 332	518	450	68	814	64. 6
Ill.	8, 818	6, 714	5, 889	825	2, 104	54. 6
Ind.	4, 719	3, 376	2, 978	398	1, 343	60. 1
Iowa	2, 903	1, 789	1, 621	168	1, 114	58. 7
Kans.	2, 286	1, 501	1, 326	175	785	58. 3
Ky.	2, 074	1, 658	1, 560	98	416	49. 0
La.	2, 490	2, 030	2, 000	30	460	55. 3
Maine	791	434	434	------------	357	44. 4
Md.	2, 659	2, 368	2, 109	259	291	58. 4
Mass.	6, 475	5, 616	5, 616	------------	859	103. 9
Mich.	5, 685	5, 603	5, 175	428	82	61. 1
Minn.	3, 247	2, 379	2, 126	253	868	59. 5
Miss.	1, 383	1, 076	1, 037	39	307	44. 4
Mo.	4, 510	3, 069	2, 609	460	1, 441	57. 2
Mont.	817	512	397	115	305	56. 6
Nebr.	2, 018	1, 168	1, 007	161	850	70. 0
Nev.	2, 366	328	316	12	2, 038	73. 3
N.H.	473	364	361	3	109	53. 3

See footnotes at end of table.

Table 99. LOCATION OF LICENSED PHARMACISTS ACCORDING TO RESIDENCE AND ACTIVITY STATUS AND RATIO OF PHARMACISTS TO POPULATION: JAN. 1, 1967—Con.

Location	Total number of licenses	Pharmacists resident in State			Pharmacists out of State	Active pharmacists per 100,000 population [1]
		Total	Active in practice	Not in practice		
N.J	5, 980	4, 784	4, 198	586	1, 196	60. 8
N. Mex	1, 118	598	566	32	520	56. 5
N.Y	18, 068	15, 256	13, 723	1, 533	2, 812	75. 4
N.C	2, 347	2, 019	1, 876	143	328	37. 7
N. Dak	1, 084	408	340	68	676	52. 9
Ohio	8, 095	6, 841	6, 474	367	1, 254	62. 5
Okla	2, 948	2, 001	1, 972	29	947	79. 6
Oreg	2, 201	1, 667	1, 509	158	534	76. 5
Pa	10, 716	8, 216	8, 216	------------	2, 500	70. 8
R.I	1, 081	816	717	99	265	80. 0
S.C	1, 410	1, 287	1, 250	37	123	48. 3
S. Dak	937	480	480	------------	457	70. 7
Tenn	3, 069	2, 388	2, 388	------------	681	61. 8
Tex	7, 826	6, 495	5, 783	712	1, 331	53. 8
Utah	1, 181	601	601	------------	580	59. 7
Vt	800	209	201	8	591	48. 9
Va	2, 408	1, 967	1, 783	184	441	39. 9
Wash	3, 512	2, 611	2, 285	326	901	75. 1
W. Va	1, 036	706	706	------------	330	39. 0
Wis	3, 183	2, 567	2, 257	310	616	54. 2
Wyo	811	296	277	19	515	86. 8
P.R	918	918	918	------------	------------	34. 4
V.I	25	21	21	------------	4	42. 4

Source: National Association of Boards of Pharmacy Proceedings, 1967 and U.S. Bureau of the Census: Population estimates. *Estimates of the Population of States, July 1, 1966 and 1967*. Series P–25, No. 373, September 1967, and No. 358, January 1967.

[1] Total resident population as of July 1, 1966.

[2] Data on activity status not available for 8,922 pharmacists in 2 States (Pennsylvania and West Virginia) counted here as in practice. Counts of inactive pharmacists not available in 9 additional States.

Table 100. TYPE OF PRACTICE OF ACTIVE PHARMACISTS: JAN. 1, 1967

Location	Active pharmacists	Number by type of practice						Percent in community pharmacies	
		Community pharmacy			Hospital pharmacy	Manufacturing and wholesale	Teaching, government, and other	Total [4]	Employees
		Total	Owner or partner	Employee					
Total	[1] 122, 421	[2] 97, 988	38, 407	45, 395	6, 734	4, 496	4, 281	85. 6	54. 2
Ala	1, 613	1, 344	639	705	128	90	51	83. 3	52. 5
Alaska	86	80	40	40	1	5	—	93. 0	50. 0
Ariz	992	824	244	580	95	29	44	83. 1	70. 4
Ark	946	855	456	399	65	13	13	90. 4	46. 7
Calif	10, 720	9, 510	5, 484	4, 026	699	341	170	88. 7	42. 3
Colo	1, 616	1, 396	--------	--------	112	67	41	86. 4	--------
Conn	2, 498	1, 948	957	991	136	124	290	78. 0	50. 9
Del	234	206	92	114	13	10	5	88. 0	55. 3

See footnotes at end of table.

Table 100. TYPE OF PRACTICE OF ACTIVE PHARMACISTS: JAN. 1, 1967—Continued

Location	Active pharmacists	Number by type of practice						Percent in community pharmacies	
		Community pharmacy			Hospital pharmacy	Manufacturing and wholesale	Teaching, government, and other	Total [4]	Employees
		Total	Owner or partner	Employee					
D.C.	862	682	137	545	68	14	98	79.1	79.9
Fla.	4,697	4,204	-------	-------	117	240	136	89.5	-------
Ga.	2,405	1,895	996	899	125	235	150	78.8	47.4
Hawaii	200	177	-------	-------	9	7	7	88.5	-------
Idaho	450	414	211	203	18	13	5	92.0	49.0
Ill.	5,889	4,852	2,138	2,714	613	272	152	82.4	55.9
Ind.	2,978	2,468	996	1,472	198	240	72	82.9	59.6
Iowa	1,621	1,375	757	618	106	112	28	84.8	44.9
Kans.	1,326	1,173	596	577	85	45	23	88.5	49.2
Ky.	1,560	1,431	-------	-------	84	30	15	91.7	-------
La.	2,000	1,830	1,083	747	82	60	28	91.5	40.8
Maine	434	417	153	264	11	6	—	96.1	63.3
Md.	2,109	1,922	415	1,507	74	80	33	91.1	78.4
Mass.	[3] 5,616	5,616	1,872	3,744	-------	-------	-------	-------	-------
Mich.	5,175	4,475	2,135	2,340	545	110	45	86.5	52.3
Minn.	2,126	1,651	927	724	150	81	244	77.7	43.9
Miss.	1,037	934	568	366	54	32	17	90.1	39.2
Mo.	2,609	2,205	961	1,244	225	160	19	84.5	56.4
Mont.	397	354	219	135	26	9	8	89.2	38.1
Nebr.	1,007	843	445	398	55	47	62	83.7	47.2
Nev.	316	290	95	195	20	1	5	91.8	67.2
N.H.	361	211	150	61	40	65	45	58.4	28.9
N.J.	4,198	3,721	-------	-------	85	239	153	88.6	-------
N. Mex.	566	483	303	180	30	26	27	85.3	37.3
N.Y.	13,723	10,983	3,738	7,245	876	931	933	80.0	66.0
N.C.	1,876	1,732	849	883	100	31	13	92.3	51.0
N. Dak.	340	304	161	143	21	9	6	89.4	47.0
Ohio	6,474	5,735	2,700	3,035	333	214	192	88.6	52.9
Okla.	1,972	1,810	760	1,050	58	53	51	91.8	58.0
Oreg.	1,509	1,330	493	837	89	32	58	88.1	62.9
Pa.	8,216	-------	-------	-------	-------	-------	-------	-------	-------
R.I.	717	622	257	365	37	33	25	86.8	58.7
S.C.	1,250	1,132	514	618	51	28	39	90.6	54.6
S. Dak.	480	429	-------	-------	23	17	11	89.4	-------
Tenn.	2,388	2,109	-------	-------	124	91	64	88.3	-------
Tex.	5,783	5,105	3,040	2,065	334	42	302	88.3	40.5
Utah	601	531	-------	-------	31	23	16	88.4	-------
Vt.	201	188	-------	-------	9	4	—	93.5	-------
Va.	1,783	1,398	636	762	115	38	232	78.4	54.5
Wash.	2,285	1,817	767	1,050	228	67	173	79.5	57.8
W. Va.	706	-------	-------	-------	-------	-------	-------	-------	-------
Wis.	2,257	1,946	951	995	211	67	33	86.2	51.1
Wyo.	277	265	117	148	6	3	3	95.7	55.8
P.R.	918	750	350	400	15	10	143	81.7	53.3
V.I.	21	16	5	11	4	—	1	76.2	68.8

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[1] Data not available on type of practice of 8,922 pharmacists in 2 States.

[2] Data not available on nature of employment of 14,186 retail pharmacists in 9 additional States.

[3] Includes only pharmacists in community pharmacies.

[4] Excludes 3 States for which data on percent of pharmacists in community pharmacies are not available.

Source: National Association of Boards of Pharmacy Proceedings, 1967.

Table 101. SCHOOLS OF PHARMACY, STUDENTS AND GRADUATES: 1958–59 THROUGH 1966–67

Academic year	Schools	Students [1]	Graduates
1966–67	[2] 75	13, 068	3, 744
1965–66	75	12, 352	3, 659
1964–65	[3] 76	11, 968	3, 360
1963–64	77	10, 291	2, 195
1962–63	77	10, 632	4, 163
1961–62	77	10, 827	3, 699
1960–61	77	13, 606	3, 438
1959–60	77	12, 506	3, 497
1958–59	77	12, 273	3, 686

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[1] Enrollment data for the last 3 classes are shown because some colleges accept students only after 1 or 2 years of preprofessional education, hence only the last 3 years provide valid statistics for trends.

[2] Includes Hampden College which is not listed by the accrediting body, and the University of Puerto Rico for which data on students and graduates are not available for any years.

[3] Includes Loyola University of the South which was not listed by the accrediting body, had no graduates in 1965, and was closed June 30, 1965.

Source: American Association of Colleges of Pharmacy: Report on enrollment in schools and colleges of pharmacy, 1st semester, term, or quarter 1966–67. Also, Report of degrees conferred by schools and colleges of pharmacy for the academic year 1965–66. *Am. J. Pharmaceutical Ed.* 31(2), February 1967. Published annually. Data for United States and Puerto Rico.

Table 102. LOCATION AND OWNERSHIP OF SCHOOLS OF PHARMACY, AND NUMBERS OF STUDENTS AND GRADUATES: 1966–67

Location	School	Ownership	Students	Graduates
	Total, 75 schools		13,068	3,744
Ala.	Auburn University School of Pharmacy, Auburn	Public	198	62
	Samford University (Howard College) School of Pharmacy, Birmingham.	Private	201	73
Ariz.	University of Arizona College of Pharmacy, Tucson	Public	163	40
Ark.	University of Arkansas School of Pharmacy, Little Rock	do	130	40
Calif.	University of California School of Pharmacy, San Francisco.	do	229	66
	University of the Pacific School of Pharmacy, Stockton	Private	192	62
	University of Southern California School of Pharmacy, Los Angeles.	do	303	103
Colo.	University of Colorado School of Pharmacy, Boulder	Public	92	15
Conn.	University of Connecticut School of Pharmacy, Storrs	do	175	49
D.C.	Howard University College of Pharmacy, Washington	Private	90	26
Fla.	Florida Agricultural and Mechanical University School of Pharmacy, Tallahassee.	Public	45	13
	University of Florida College of Pharmacy, Gainesville	do	234	57
Ga.	Southern College of Pharmacy of Mercer University, Atlanta.	Private	161	35
	University of Georgia School of Pharmacy, Athens	Public	396	120
Idaho	Idaho State University College of Pharmacy, Pocatello	do	94	17
Ill.	University of Illinois at the Medical Center College of Pharmacy, Chicago.	do	336	99
Ind.	Butler University College of Pharmacy, Indianapolis	Private	99	37
	Purdue University School of Pharmacy and Pharmacal Sciences, Lafayette.	Public	321	110
Iowa	Drake University College of Pharmacy, Des Moines	Private	187	69
	State University of Iowa College of Pharmacy, Iowa City.	Public	148	36
Kans.	University of Kansas School of Pharmacy, Lawrence	do	137	41
Ky.	University of Kentucky College of Pharmacy, Lexington	do	147	46
La.	Northeast Louisiana State College School of Pharmacy, Monroe.	do	366	98
	Xavier University of Louisiana College of Pharmacy, New Orleans.	Private	44	7
Md.	University of Maryland School of Pharmacy, Baltimore	Public	118	28
Mass.	Hampden College School of Pharmacy, Williamansett[1]	Private	----------	----------
	Massachusetts College of Pharmacy, Boston	do	334	117
	Northeastern University College of Pharmacy, Boston	do	112	18
Mich.	Ferris State College School of Pharmacy, Big Rapids	Public	261	66
	University of Michigan College of Pharmacy, Ann Arbor.	do	88	15
	Wayne State University College of Pharmacy, Detroit	do	98	21
Minn.	University of Minnesota College of Pharmacy, Minneapolis.	do	190	38
Miss.	University of Mississippi School of Pharmacy, University.	do	211	69
Mo.	St. Louis College of Pharmacy, St. Louis	Private	231	68
	University of Missouri at Kansas City School of Pharmacy, Kansas City.	Public	97	14
Mont.	University of Montana School of Pharmacy, Missoula	do	104	25
Nebr.	Creighton University School of Pharmacy, Omaha	Private	114	33
	University of Nebraska College of Pharmacy, Lincoln	Public	165	40
N.J.	Rutgers, The State University College of Pharmacy, Newark.	do	163	55
N. Mex.	University of New Mexico College of Pharmacy, Albuquerque.	do	83	20

See footnotes at end of table.

Table 102. LOCATION AND OWNERSHIP OF SCHOOLS OF PHARMACY, AND NUMBERS OF STUDENTS AND GRADUATES: 1966—Continued

Location	School	Ownership	Students	Graduates
N.Y.	Albany College of Pharmacy of Union University, Albany.	Private	247	68
	Brooklyn College of Pharmacy of Long Island University, Brooklyn.	do	285	85
	Columbia University College of Pharmacy of the City of New York, New York.	do	180	61
	Fordham University College of Pharmacy, Bronx	do	134	41
	St. John's University College of Pharmacy, Jamaica	do	200	47
	State University of New York School of Pharmacy, SUNY at Buffalo, Buffalo.	Public	135	33
N.C.	University of North Carolina School of Pharmacy, Chapel Hill.	do	230	57
N. Dak.	North Dakota State University College of Pharmacy, Fargo.	do	227	69
Ohio	Ohio Northern University School. of Pharmacy, Ada	Private	86	73
	Ohio State University College of Pharmacy, Columbus	Public	176	51
	University of Cincinnati College of Pharmacy, Cincinnati.	do	145	43
	University of Toledo College of Pharmacy, Toledo	do	70	21
Okla.	Southwestern State College School of Pharmacy, Weatherford.	do	304	95
	University of Oklahoma College of Pharmacy, Norman	do	214	70
Oreg.	Oregon State University School of Pharmacy, Corvallis	do	179	51
Pa.	Duquesne University School of Pharmacy, Pittsburgh	Private	92	28
	Philadelphia College of Pharmacy and Science, Philadelphia.	do	298	87
	Temple University School of Pharmacy, Philadelphia	do	200	66
	University of Pittsburgh School of Pharmacy, Pittsburgh.	do	127	32
R.I.	University of Rhode Island College of Pharamcy, Kingston.	Public	80	20
S.C.	Medical College of South Caorlina School of Pharmacy, Charleston.	do	81	12
	University of South Carolina School of Pharmacy, Columbia.	do	138	42
S. Dak.	South Dakota State University College of Pharmacy, Brookings.	do	155	39
Tenn.	University of Tennessee College of Pharmacy, Memphis	do	270	76
Tex.	Texas Southern University School of Pharmacy, Houston.	do	149	19
	University of Houston College of Pharmacy, Houston	do	293	67
	University of Texas College of Pharmacy, Austin	do	362	118
Utah	University of Utah College of Pharmacy, Salt Lake City.	do	146	37
Va.	Medical College of Virginia School of Pharmacy, Richmond.	do	212	64
Wash.	University of Washington College of Pharmacy, Seattle	do	175	48
	Washington State University College of Pharmacy, Pullman.	do	98	26
W. Va.	West Virginia University School of Pharmacy, Morgantown.	do	126	39
Wis.	University of Wisconsin School of Pharmacy, Madison	do	341	95
Wyo.	University of Wyoming College of Pharmacy, Laramie	do	56	16
P.R.	University of Puerto Rico College of Pharmacy, Rio Piedras.[2]	do	----	----

[1] Not listed by the accrediting body.

[2] Data are not available.

Source: American Association of Colleges of Pharmacy.

CHAPTER 24

Physical Therapy

Physical therapy is concerned with the restoration of function and the prevention of disability following disease, injury, or loss of a bodily part. The goal is to help the patient reach his maximum performance and to assume his due place in society while learning to live within the limits of his capabilities. The therapeutic properties of exercise, heat, cold, electricity, ultrasound, and massage are used to achieve this goal. Upon referral by a physician, the physical therapist evaluates the patient and plans the program which will be most effective.

The number of persons employed as *physical therapists* has increased from about 4,600 in 1950 to nearly 9,000 in 1960 and perhaps was in excess of 13,000 in 1967. This estimate assumes that the 8,159 members of the American Physical Therapy Association who are in active practice constitute about two-thirds of the labor force in this field (table 103). The majority (almost 8,500 in 1966) work in hospitals, while others are employed by rehabilitation centers, schools or societies for crippled children, and public health agencies.

A license is required to practice physical therapy in 48 States, the District of Columbia, and Puerto Rico. To obtain a license, an applicant must have a degree or certificate from an approved school of physical therapy and pass a State board examination.

Forty-six colleges and universities offer programs leading to professional qualification in physical therapy under three plans of education: 42 have a 4-year bachelor's degree course for high school graduates and transfer students, 20 have a 12- or 16-month certificate course for students who hold a bachelor's degree in a subject other than physical therapy, and five have a 2-year graduate program leading to a master's degree for students with bachelor's degrees and the requisite background. As part of the total educational program all plans provide for a minimum of 4 months' clinical education experience in health care facilities. During this time physical therapy students participate in the care of patients under the supervision of qualified physical therapists.

In the fall of 1967, a total of 1,165 students—907 seniors and about 258 postbaccalaureate students—were enrolled in their final academic year. During the calendar year 1967, 1,005 were graduated as clinical physical therapists (tables 104 and 105). An increased number of graduates are anticipated in the near future due to expanded college enrollment and to new courses in physical therapy now being developed at six institutions.

The physical therapist may have the help of a *physical therapy assistant and/or aide* who works directly under supervision in carrying out the program of rehabilitating patients in hospitals and other health care facilities. In-service training programs for aides are conducted by some hospitals and health agencies. Two-year junior college level programs for physical therapy assistants are also being developed. Between 6,000 and 8,000 assistants and aides are currently employed.

Table 103. LOCATION OF PHYSICAL THERAPISTS WHO ARE MEMBERS OF THE AMERICAN PHYSICAL THERAPY ASSOCIATION: 1967 [1]

Location	Members in active practice	Members with part-time practice or no practice
All locations	8, 298	2, 196
United States	8, 159	2, 135
Alabama	57	10
Alaska	21	9
Arizona	85	30
Arkansas	27	5
California	1, 269	340
Colorado	140	69
Connecticut	205	85
Delaware	32	12
District of Columbia	133	13
Florida	265	67
Georgia	90	16
Hawaii	54	10
Idaho	19	3
Illinois	426	96
Indiana	112	37
Iowa	127	15
Kansas	67	20
Kentucky	68	9
Louisiana	75	18
Maine	34	22
Maryland	136	55
Massachusetts	377	158
Michigan	298	68
Minnesota	171	34
Mississippi	33	2
Missouri	189	36
Montana	14	6
Nebraska	47	11
Nevada	21	4
New Hampshire	35	21
New Jersey	226	94
New Mexico	31	17
New York	718	177
North Carolina	165	40
North Dakota	23	4
Ohio	374	98
Oklahoma	76	16
Oregon	120	14
Pennsylvania	503	108
Rhode Island	47	18
South Carolina	57	11
South Dakota	25	2
Tennessee	73	11
Texas	370	66
Utah	41	8
Vermont	33	7
Virginia	146	36
Washington	207	55
West Virginia	40	8
Wisconsin	246	56
Wyoming	11	8
Puerto Rico	31	6
Foreign	108	55

[1] Membership location as of April 1967.

Source: American Physical Therapy Association.

Table 104. INSTITUTIONS OFFERING APPROVED COURSES IN PHYSICAL THERAPY, STUDENTS AND GRADUATES: 1960–67

Year	Institutions	Seniors and postbaccalaureate students [1]	Graduates [2]
1967	46	1, 165	1, 005
1966	43	1, 066	936
1965	42	991	890
1964	42	955	891
1963	42	930	757
1962	42	814	689
1961	42	727	682
1960	41	767	673

[1] October enrollment of undergraduate students in 4th year of P.T. degree program, 5th year for postbaccalaureate students, 6th year for students in master's degree programs.

[2] Graduates during calendar year.

Source: American Physical Therapy Association.

Table 105. LOCATION AND OWNERSHIP OF INSTITUTIONS OFFERING APPROVED COURSES IN PHYSICAL THERAPY AND NUMBERS OF STUDENTS AND GRADUATES: 1967

Location	Institution	Ownership	Seniors [1]	Postbaccalaureate students[2]	Graduates [3]
	Total, 46 institutions		907	258	1,005
Ala.	University of Alabama in Birmingham, Curriculum in Physical Therapy, Birmingham.	Public	5	—	7
Calif.	Childrens Hospital of Los Angeles, School of Physical Therapy, Los Angeles.	Private	1	15	16
	Loma Linda University, Dept. of Physical Therapy, School of Health Related Professions, Loma Linda.	do	42	—	26
	Stanford University, Division of Physical Therapy, School of Medicine, Palo Alto.	do	5	21	23
	University of California, Curriculum in Physical Therapy, The Medical Center, San Francisco.	Public	21	11	30
	University of Southern California, Department of Physical Therapy, Los Angeles.	Private	[4] 29	—	23
Colo.	University of Colorado, Curriculum in Physical Therapy, Medical School, Denver.	Public	26	4	30
Conn.	University of Connecticut, School of Physical Therapy, Storrs.	do	58	—	40
Fla.	University of Florida, Department of Physical Therapy, J. Hillis Miller Center, Gainesville.	do	18	—	19
Ill.	Northwestern University, Programs in Physical Therapy, Medical School, Chicago.	Private	18	10	23
Ind.	Indiana University, Physical Therapy Program, School of Medicine, Indianapolis.	Public	28	—	24
Iowa	University of Iowa, Physical Therapy, Childrens Hospital, Iowa City.	do	—	[5] 27	23
Kans.	University of Kansas, Medical Center, Physical Therapy Education, Kansas City.	do	17	8	18
Ky.	University of Kentucky, Department of Physical Therapy, School of Allied Health Professions, Medical Center, Lexington.	do	6	—	2
Md.	University of Maryland, Department of Physical Therapy, School of Medicine, Baltimore.	do	16	—	13
Mass.	Boston University, Division of Physical Therapy, Sargent College of Allied Health Professions, Boston.	Private	28	—	30
	Northeastern University, Department of Physical Therapy, Boston-Bouve College, Boston.	do	29	—	31
	Simmons College, Program in Physical Therapy, Boston.	do	7	3	13
Mich.	University of Michigan, Curriculum in Physical Therapy, Medical Center, Ann Arbor.	Public	24	5	24
	Wayne State University, Division of Physical Therapy, Detroit.	do	4	—	5
Minn.	Mayo Clinic, School of Physical Therapy, Rochester.	Private	34	—	28
	University of Minnesota, Course in Physical Therapy, Minneapolis.	Public	31	—	25
Mo.	St. Louis University, Department of Physical Therapy, St. Louis.	Private	29	—	19
	University of Missouri, Physical Therapy Curriculum, Medical Center, Columbia.	Public	21	—	17
	Washington University, Department of Physical Therapy, School of Medicine, St. Louis.	Private	12	—	10

See footnotes at end of table.

Table 105. LOCATION AND OWNERSHIP OF INSTITUTIONS OFFERING APPROVED COURSES IN PHYSICAL THERAPY AND NUMBERS OF STUDENTS AND GRADUATES: 1967—Continued

Location	Institution	Ownership	Seniors [1]	Postbaccalaureate students [2]	Graduates [3]
N.Y.	Columbia University, Courses in Physical Therapy, College of Physicians and Surgeons, New York.	Private	9	19	30
	Ithaca College-Albert Einstein College of Medicine, Division of Physical Therapy, Ithaca.	do	64	—	44
	New York University, Physical Therapy Program, School of Education, New York.	do	17	[5] 7	21
	Russell Sage College-Albany Medical College, School of Physical Therapy, Albany.	do	19	—	23
	State University of New York at Buffalo, Department of Physical Therapy, Buffalo.	Public	20	4	16
N.C.	Duke University, Programs in Physical Therapy, Medical College, Durham.	Private	—	[5] 13	14
	University of North Carolina, Division of Physical Therapy, School of Medicine, Chapel Hill.	Public	15	—	14
Ohio	Case Western Reserve University, Graduate Physical Therapy Curriculum, Cleveland.	Private	[6] 7	—	8
	Ohio State University, Curriculum in Physical Therapy, Columbus.	Public	44	4	49
Okla.	University of Oklahoma, School of Physical Therapy, Medical Center, Oklahoma City.	do	21	—	13
Pa.	D. T. Watson School of Physiatrics, Division of Physical Therapy, Leetsdale.	Private	23	16	36
	University of Pennsylvania, Department of Physical Therapy, Philadelphia.	do	11	47	41
Tenn.	University of Tennessee, Physical Therapy School, Memphis.	Public	—	5	3
Tex.	Baylor University, School of Physical Therapy, Baylor University Medical Center, Dallas.	Private	4	16	25
	Medical Field Service School, Physical Therapy Course, Brooke Army Medical Center, Fort Sam Houston.	Public	—	20	18
	University of Texas, School of Physical Therapy, The Medical Branch, Galveston.	do	21	3	17
Va.	Medical College of Virginia, School of Physical Therapy, Richmond.	do	22	—	27
Wash.	University of Washington, Curriculum in Physical Therapy, University Hospital, Seattle.	do	16	—	18
Wis.	Marquette School of Medicine, Inc., Curriculum in Physical Therapy, Milwaukee.	Private	26	—	17
	University of Wisconsin, Course in Physical Therapy, Madison.	Public	36	—	25
P.R.	University of Puerto Rico, School of Physical and Occupational Therapy, Puerto Rico Medical Center, Industrial Hospital, Rio Piedras.	do	23	—	27

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[1] October 1967 enrollment in final year of P.T. baccalaureate or master's degree program.

[2] October 1967 enrollment in 5th year for students with degree in other than P.T.

Source: American Physical Therapy Association.

[3] Calendar year 1967 data on graduates.

[4] Bachelor's and master's degree programs offered.

[5] May lead to a master's degree.

[6] Master's degree program offered.

CHAPTER 25

Podiatry

Podiatry, formerly known as chiropody, is that profession which deals with the examination, diagnosis, prevention, treatment and care of conditions and functions of the human foot. The podiatrist fits corrective and supportive devices, performs surgical and other operative procedures on the foot, prescribes proper footgear, and administers and prescribes drugs and physical therapy for patient care.

About 8,000 *podiatrists* located in the United States were actively engaged in their profession at the end of 1967, according to the American Podiatry Association (4,800 members). Probably 95 percent of these registered podiatrists are active practitioners. The number of active podiatrists has increased from about 6,400 in 1950 and nearly 7,600 in 1964 to about 8,000 in 1967.

Information on the State distributions of registered podiatrists is presented in table 106, and on their professional activities in table 107. Nearly all of the active podiatrists are self-employed, with relatively few holding full-time salaried positions in hospitals or schools of podiatry. They tend to practice mainly in large cities in the most heavily populated States.

Podiatry specialty organizations recognized by the American Podiatric Association are the American College of Foot Orthopedists (105 specialists); American College of Foot Roentgenologists (56); American College of Foot Surgeons, Inc. (325); and American Society of Podiatric Dermatology (35).

All States and the District of Columbia require a license for the practice of podiatry. To qualify for a license, an applicant must have graduated from a college of podiatry and must pass a State board (or the National Board) examination. In addition, three States require a period of internship or practice.

The five colleges of podiatry in the United States admit students who have already completed at least 2 years of college. The subsequent 4 years of training lead to a degree of Doctor of Podiatric Medicine (D.P.M.) or Doctor of Podiatry (Pod. D. or D.P.).

In the academic year 1966–67, the five colleges enrolled 843 students and graduated 166 podiatrists (tables 108 and 109).

Table 106. LOCATION OF REGISTERED PODIATRISTS: 1968

Location	Number of podiatrists	Location	Number of podiatrists
United States	8, 506	Missouri	97
		Montana	12
Alabama	30	Nebraska	44
Alaska	2	Nevada	13
Arizona	39	New Hampshire	26
Arkansas	20	New Jersey	511
California	807	New Mexico	23
Colorado	75	New York	1,561
Connecticut	194	North Carolina	52
Delaware	20	North Dakota	11
District of Columbia	68	Ohio	560
Florida	182	Oklahoma	49
Georgia	52	Oregon	36
Hawaii	4	Pennsylvania	1,027
Idaho	20	Rhode Island	72
Illinois	775	South Carolina	15
Indiana	201	South Dakota	18
Iowa	103	Tennessee	36
Kansas	52	Texas	167
Kentucky	59	Utah	18
Louisiana	34	Vermont	7
Maine	31	Virginia	59
Maryland	83	Washington	68
Massachusetts	580	West Virginia	47
Michigan	282	Wisconsin	163
Minnesota	87	Wyoming	6
Mississippi	8		

Source: American Podiatry Association.

Table 107. TYPE OF PRACTICE OF PODIATRISTS: 1964

Type of practice	Number of respondents	Percent of respondents	Type of practice	Number of respondents	Percent of respondents
Total	[1] 3, 290	100.0	Administration, teaching, or research	12	0.4
Private practice	3, 093	94.0	Other	63	1.9
Institutional practice	49	1.5	Retired	73	2.2

[1] The questionnaire was mailed to all known registered podiatrists (8,008).

Source: American Podiatry Association, Special Studies Division: 1964 survey of the podiatry profession. *J. Am. Podiatry A.* Vols. 54 and 55, 1964 and 1965. Reprint No. 1:6601.

Table 108. PODIATRY COLLEGES, STUDENTS, AND GRADUATES: SELECTED YEARS, 1951-52 THROUGH 1967-68

Academic year	Colleges	Students	Graduates	Academic year	Colleges	Students	Graduates
1967-68	5	933	----------	1961-62	5	472	96
1966-67	5	843	166	1960-61	5	478	116
1965-66	5	713	136	1959-60	5	465	112
1964-65	5	625	122	1955-56	6	700	142
1963-64	5	585	97	1951-52	8	1, 633	476
1962-63	4	496	114				

Source: American Podiatry Association.

Table 109. LOCATION AND OWNERSHIP OF PODIATRY COLLEGES AND NUMBERS OF STUDENTS AND GRADUATES: 1966-67

Location	School [1]	Ownership	Students	Graduates
	Total, 5 schools	-------------	843	166
Calif	California Podiatry College, San Francisco	Private	176	25
Ill	Illinois College of Podiatry, Chicago	do	150	42
N.Y.	M. J. Lewi College of Podiatry, New York	do	153	30
Ohio	Ohio College of Podiatry, Cleveland	do	247	51
Pa	Pennsylvania College of Podiatry, Philadelphia	do	117	18

[1] Independent institutions.

Source: American Podiatry Association.

CHAPTER 26

Psychology

Psychology is a science dealing with the understanding and modification of human behavior. As such it is directly relevant to problems of mental health and to other areas of health in which psychological functioning involving learning, perception, development, adjustment, ability, and personality are important factors.

About one-third of all *psychologists* are engaged in health activities. The number of psychologists in the health field has increased from about 3,000 in 1950 to nearly 9,000 in 1965 with little change by 1967 (table 110). The American Psychological Association has about 27,000 members or associates in all fields. The Association bases eligibility for membership upon completion of a program leading to a doctoral degree in psychology.

About one-third of all psychologists are in an area of psychology related to the health field called *clinical psychology*. Approximately 5,100 clinical psychologists are engaged primarily in the diagnosis and treatment of mental illness in hospitals and clinics although some are in private practice. These individuals are performing as consultants to community mental health programs and to school systems in increasing numbers. Many are engaged in, or direct, basic and applied research on problems related to these concerns. The training of a clinical psychologist, in addition to research training and experience, entails a year of supervised internship in an appropriate setting prior to the granting of the Ph.D.

About 1,800 *counseling psychologists* work in schools, industry and community agencies to forestall mental illness. They help the individual understand himself so that he can deal effectively with his own problems.

Not limited to the health field are the *social psychologists* who are concerned with group reactions and the ways in which our social attitudes develop, and the *measurement psychologists* or *psychometrists* who devise tests for measuring people's mental, emotional, and social characteristics. These last two categories are small in numbers—about 600 and 300 persons respectively, with probably fewer than half directly involved in health projects.

As of 1967, there were provisions for licensing psychologists in 30 States.

Although some of the practicing psychologists have had only 1 or 2 years of graduate study in psychology, the usual requirement for practice is 4 years of study leading to a Ph.D. degree, with at least 1 year of internship to provide supervised clinical experience.

About 100 universities offer doctoral degrees in clinical psychology, including 71 programs accredited by the American Psychological Association. In all, approximately 275 university programs offer advanced degrees in psychology. Earned degrees conferred in the field of psychology in 1965–66, by type of specialty, are as follows:

Specialty	*Master's*	*Doctor's*
Total	2, 530	1, 133
General psychology	1, 839	33
Clinical psychology	108	368
Counseling psychology	84	57
Social psychology	11	107
Rehabilitation counselor training	109	([1])
Educational psychology	107	47
Psychology, all other fields	272	521

[1] Not included as a separate category.

Data on master's degrees are from the Office of Education's survey of college and university registrars (table 111) (*37*). Doctoral data are from the National Academy of Sciences' survey of degree recipients (table 112) (*38*).

REFERENCES

(*37*) National Center for Educational Statistics: *Summary Report on Bachelor's and Higher Degrees Conferred During the Year 1965–66*. OE–54013A–66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968.

(*38*) National Academy of Sciences: *Doctorate Recipients From United States Universities, 1958–1966*. Pub. No. 1489. Washington, D.C. 1967.

Table 110. LOCATION OF PSYCHOLOGISTS IN THE HEALTH FIELD: 1966

Location	Total	Clinical	Counseling and guidance	Social	Measurement
All locations	[1] 7,796	5,104	1,750	627	315
United States	7,732	5,078	1,732	609	313
Alabama	36	25	9	2	—
Alaska	2	1	—	1	—
Arizona	55	29	20	4	2
Arkansas	32	19	12	1	—
California	1,026	721	189	79	37
Colorado	148	106	29	11	2
Connecticut	132	96	20	12	4
Delaware	24	16	6	2	—
District of Columbia	185	101	37	23	24
Florida	186	126	42	11	7
Georgia	99	60	31	5	3
Hawaii	27	15	9	2	1
Idaho	27	9	18	—	—
Illinois	476	307	109	42	18
Indiana	157	78	46	21	12
Iowa	112	74	27	5	6
Kansas	130	96	25	8	1
Kentucky	64	45	9	7	3
Louisiana	54	38	10	5	1
Maine	36	26	7	2	1
Maryland	175	119	23	22	11
Massachusetts	347	225	79	34	9
Michigan	331	215	60	41	15
Minnesota	176	105	58	8	5
Mississippi	24	18	5	—	1
Missouri	127	82	33	9	3
Montana	11	3	6	2	—
Nebraska	50	30	11	6	3
Nevada	14	9	4	1	—
New Hampshire	22	13	7	1	1
New Jersey	250	156	55	18	21
New Mexico	32	22	8	1	1
New York	1,266	892	234	97	43
North Carolina	98	61	23	10	4
North Dakota	19	14	5	—	—
Ohio	301	190	82	16	13
Oklahoma	70	53	14	3	—
Oregon	88	57	23	6	2
Pennsylvania	465	284	134	28	19
Rhode Island	14	12	1	—	1
South Carolina	29	19	7	3	—
South Dakota	21	10	10	—	1
Tennessee	90	60	14	11	5
Texas	224	131	63	16	14
Utah	57	33	16	6	2
Vermont	10	8	1	1	—
Virginia	93	64	18	8	3
Washington	111	71	29	8	3
West Virginia	28	20	6	1	1
Wisconsin	158	99	40	9	10
Wyoming	23	15	8	—	—

See footnotes at end of table.

Table 110. LOCATION OF PSYCHOLOGISTS IN THE HEALTH FIELD: 1966—Continued

Location	Total	Clinical	Counseling and guidance	Social	Measurement
Guam	—	—	—	—	—
Puerto Rico	9	3	5	1	—
Virgin Islands	1	1	—	—	—
Canal Zone	—	—	—	—	—
Foreign areas	54	22	13	17	2

[1] Specialty as indicated by respondents to the Psychology Section of the 1966 Register. Data presented are based on question which asks for the respondent's specialization most closely related to *present* employment. Of all persons to whom questionnaires were sent, 19,027 returned usable data.

Source: Prepared by the Manpower Studies Section, Manpower and Analytic Studies Branch, National Institute of Mental Health based on National Science Foundation: *1966 National Register of Scientific and Technical Personnel.*

Table 111. LOCATION OF SCHOOLS CONFERRING MASTER'S DEGREES IN SELECTED FIELDS OF PSYCHOLOGY: 1965–66

Location	School	Clinical psychology	Counseling psychology[1]	Social psychology
	Total, 27 schools	108	84	10
California	Pepperdine College, Los Angeles	2	—	—
Connecticut	University of Connecticut, Storrs	4	—	1
District of Columbia	Catholic University of America, Washington	10	3	—
	American University, Washington	—	13	—
Illinois	Bradley University, Peoria	4	—	—
	Loyola University, Chicago	15	1	3
	Southern Illinois University, Carbondale	—	11	—
Kentucky	University of Louisville, Louisville	2	—	—
Massachusetts	Clark University, Worcester	6	—	—
	Harvard University, Cambridge	2	—	3
	Springfield College, Springfield	18	19	—
	Assumption College, Worcester	—	22	—
Michigan	Wayne State University, Detroit	4	—	—
Missouri	University of Missouri at Columbia	11	—	—
	University of Missouri at Kansas City	—	—	1
New Mexico	Eastern New Mexico University, Portales	—	6	—
New York	Columbia University Teachers College, New York	11	—	1
	Cornell University, Ithaca	—	—	1
North Carolina	East Carolina College, Greenville	2	—	—
North Dakota	University of North Dakota, Grand Forks	—	1	—
Rhode Island	University of Rhode Island, Kingston	2	—	—
Texas	Baylor University, Waco	1	—	—
Utah	University of Utah, Salt Lake City	5	2	—
Virginia	Richmond Professional Institution, Richmond	4	—	—
Wisconsin	Marquette University, Milwaukee	5	—	—
Washington	Eastern Washington State College, Cheney	—	2	—
	Western Washington State College, Bellingham	—	4	—

[1] Data previously included master's degrees in guidance.

Source: National Center for Educational Statistics: *Earned Degrees Conferred 1965–66.* OE–54013–66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968.

Table 112. EARNED DEGREES CONFERRED IN PSYCHOLOGY AT GRADUATE LEVELS: 1959–60 THROUGH 1965–66

Year	Total	Clinical psychology	Counseling psychology[1]	Social psychology	All others
Master's degrees					
1965–66	2,530	108	84	11	2,327
1964–65	2,241	116	138	15	1,972
1963–64	2,059	126	243	18	1,672
1962–63	1,918	96	210	16	1,596
1961–62	1,832	97	194	31	1,510
1960–61	1,719	------	236	------	1,483
1959–60	1,406	------	------	------	------
Doctor's degrees					
1965–66	1,133	368	57	107	601
1964–65	955	335	47	100	473
1963–64	1,013	398	47	90	478
1962–63	892	303	48	92	449
1961–62	857	293	60	81	423
1960–61	820	299	67	68	386
1959–60	773	241	67	80	385

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[1] Counseling and guidance prior to 1965–66.

Sources: National Center for Educational Statistics: *Summary Report on Bachelor's and Higher Degrees Conferred During the Year 1965–1966.* OE–54013A–66. Office of Education, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968. Also prior annual issues.

National Academy of Sciences: *Doctorate Recipients From United States Universities 1958–1966.* Publication 1489. Washington, D.C. 1967.

CHAPTER 27

Radiologic Technology

Radiologic technology involves the use of radiant energy in the field of medicine to assist the physician in the diagnosis and treatment of disease. *Radiologic technologists*—also called X-ray technologists or technicians—operate X-ray equipment under the general direction of a physician who is usually a radiologist. For diagnostic purposes the technologist prepares opaque solutions for the patient to drink, positions the patient between the X-ray tube and the film, selects the proper exposure, and takes X-ray photographs of parts of the body as prescribed by the physician. For therapeutic purposes the technologist operates special X-ray equipment and assists in the preparation of radium or radioactive materials for controlled application by the physician. The technologist may be responsible for keeping the equipment in working order, processing films, and recording the services performed.

It is estimated that between 75,000 and 100,000 persons were employed as radiologic technicians in 1967 (*39*). The number so employed was about 30,800 in 1950 and in excess of 60,000 by 1960.

The American Society of Radiologic Technologists lists 14,116 active and associate members in its Official Roster as of May 1967. The American Registry of Radiologic Technologists lists about 50,000 persons of whom an estimated two-thirds or about 34,000 are professionally active. The American Radiographic Technologists lists 5,000 active members.

A State distribution is available for the persons recognized by the American Registry of Radiologic Technologists (table 113). The three specialties within the field include the more generalized X-ray technology, nuclear medicine technology using radioactive isotopes, and radiation therapy technology using radiation producing devices. The last two specialties were recognized by the Registry in 1962.

About one-fourth of the technologists work in hospitals, while the remainder are employed in independent X-ray laboratories, in physicians' and dentists' offices, and in government agencies.

A license to practice as an X-ray technologist is required in one State, New York, and the Commonwealth of Puerto Rico.

As of June 30, 1966, 967 programs in X-ray technology with an estimated enrollment of 10,130 students had approval of the American Medical Association Council on Medical Education. These programs are conducted by hospitals and by community colleges and medical schools with hospital affiliation. The courses are open to high school graduates, although a few require 1 or 2 years of college or graduation from a school of nursing. The length of the training varies from a minimum of 2 years in a hospital radiology department, or a junior college offering an associate degree, to a 4-year university course leading to a bachelor's degree upon graduation.

Of the approximately 1,000 approved schools of radiologic technology, more than 90 percent are hospital-based and conduct programs of at least 24 months. These not only provide general training in diagnostic X-ray technology, but also include a limited amount of training in the technology of radiation therapy. Some programs provide limited training in nuclear medicine technology. In the academic year 1966–67, the approved schools graduated 3,827 technologists (tables 114 and 115).

After completion of training in an AMA approved program, a technologist may take an examination given by The American Registry of Radiologic Technologists. Successful completion of the examination qualifies the technologist to use the title Registered Technologist—RT(ARRT).

REFERENCES

(*39*) Division of Radiological Health: *National Conference on X-ray Technician Training.* Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1966.

Table 113. LOCATION OF REGISTERED RADIOLOGIC TECHNOLOGISTS: 1967 [1]

Location	X-ray technology	Nuclear medicine technology	Radiation therapy technology
All locations	48, 733	390	181
United States	48, 707	390	181
Alabama	603	8	6
Alaska	55	—	—
Arizona	417	4	1
Arkansas	417	1	—
California	5, 059	48	29
Colorado	934	12	2
Connecticut	1, 128	5	3
Delaware	149	—	—
District of Columbia	154	1	2
Florida	1, 424	10	7
Georgia	865	9	4
Hawaii	159	1	—
Idaho	181	—	1
Illinois	2, 916	17	11
Indiana	1, 253	8	5
Iowa	880	1	—
Kansas	659	7	2
Kentucky	593	8	2
Louisiana	745	5	2
Maine	311	3	—
Maryland	866	8	7
Massachusetts	1, 668	8	3
Michigan	1, 972	21	11
Minnesota	1, 515	6	2
Mississippi	311	4	1
Missouri	1, 116	12	6
Montana	180	—	2
Nebraska	448	4	2
Nevada	125	—	—
New Hampshire	242	—	—
New Jersey	1, 320	9	6
New Mexico	223	—	—
New York	3, 401	26	16
North Carolina	915	10	2
North Dakota	170	1	—
Ohio	2, 807	31	6
Oklahoma	530	5	1
Oregon	629	—	4
Pennsylvania	3, 090	27	10
Rhode Island	259	1	—
South Carolina	503	1	1
South Dakota	203	—	1
Tennessee	729	9	1
Texas	2, 444	31	6
Utah	226	3	—
Vermont	186	2	—
Virginia	912	8	4
Washington	794	2	3
West Virginia	399	3	—
Wisconsin	1, 536	10	9
Wyoming	86	—	—
Puerto Rico	26	—	—

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[1] Includes active and inactive.

Source: The American Registry of Radiologic Technologists. Minneapolis, September 1967.

Table 114. APPROVED EDUCATIONAL PROGRAMS IN X-RAY TECHNOLOGY, STUDENTS AND GRADUATES: SELECTED YEARS, 1949–50 THROUGH 1966–67

Academic year	Schools	Students [1]	Graduates
1966–67 [2]	967	10, 130	3, 827
1965–66	901	[3] 8, 970	----------
1964–65 [2]	789	7, 726	3, 158
1963–64 [2]	755	7, 415	2, 887
1962–63	718	6, 231	2, 722
1961–62	673	5, 512	2, 315
1960–61	650	5, 049	----------
1959–60	609	4, 581	2, 285
1955–56	422	2, 613	1, 966
1949–50	267	1, 447	923

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[1] Students enrolled in 24-month program or last 2 years of 3- or 4-year course.

[2] Final figures to replace preliminary estimates published in *J.A.M.A.*

[3] Estimated.

Source: Council on Medical Education: Education Number of the *J.A.M.A.* Chicago. American Medical Association. Annual issues and The American Society of Radiologic Technologists.

Table 115. LOCATION OF APPROVED SCHOOLS OFFERING PROGRAMS IN X-RAY TECHNOLOGY AND NUMBERS OF STUDENTS AND GRADUATES: 1966–67

Location	Schools	Students	Graduates
Total	[1] 964	10, 130	3, 827
Alabama	10	126	45
Alaska	—	—	—
Arizona	7	45	19
Arkansas	6	79	33
California	59	469	174
Colorado	16	221	80
Connecticut	18	246	82
Delaware	—	—	—
District of Columbia	4	44	17
Florida	22	284	91
Georgia	18	204	89
Hawaii	2	13	6
Idaho	5	31	16
Illinois	57	559	237
Indiana	19	293	71
Iowa	21	208	83
Kansas	19	154	64
Kentucky	15	154	59
Louisiana	12	177	59
Maine	8	112	41
Maryland	13	258	132
Massachusetts	51	438	197
Michigan	38	377	145
Minnesota	37	399	119
Mississippi	8	68	20
Missouri	28	270	118
Montana	7	44	13
Nebraska	10	87	47
Nevada	2	17	7
New Hampshire	8	45	17
New Jersey	26	292	121
New Mexico	4	27	9
New York	45	533	219
North Carolina	23	193	82
North Dakota	7	48	15
Ohio	62	723	275
Oklahoma	8	96	45
Oregon	[2] 10	75	32
Pennsylvania	75	861	364
Rhode Island	6	63	25
South Carolina	12	132	48
South Dakota	8	51	16
Tennessee	14	210	63
Texas	[2,3] 53	[3] 463	[3] 80
Utah	7	55	21
Vermont	4	60	24
Virginia	20	234	92
Washington	10	92	28
West Virginia	22	182	65
Wisconsin	26	304	117
Wyoming	2	14	5

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[1] Of the total 967 schools approved as of June 1966, 3 did not submit 1966-67 reports. Of the 964 schools, 8 did not report on graduates, 79 reported none, 253 reported 1 or 2, and 632 reported 3 or more graduates.

Source: The American Society of Radiologic Technologists.

[2] Includes 1 school that did not report on students and graduates.

[3] 1 army service school has a 13-week didactic program, with 711 graduates; information on student and graduates not included.

CHAPTER 28

Secretarial and Office Services

Secretarial and office services are usually provided to physicians, dentists, optometrists, and other doctors in clinical practice through duties performed by *receptionists, secretaries, assistants,* and/or *aides.* Excluded from this category, however, are nurses and medical and dental laboratory personnel (technologists, technicians, and assistants), all of whom are considered in other chapters of this report.

Professional offices and admitting offices of hospitals and related institutions usually employ one or more persons to perform many and varied duties such as scheduling appointments, receiving patients, recording case histories, usher the patient into the consultation or examination room, setting out the necessary instruments, and perhaps assisting the doctor by handing him instruments or performing other functions. There are also clerical duties involving correspondence, payments, monthly statements, supplies, insurance forms, and reports.

The person who prepares the examination room and hands instruments and materials to the doctor as directed is frequently called an *office assistant* or *aide* rather than a secretary. Medical assistants who perform laboratory services are included in chapter 7; dental assistants in chapter 8.

The receptionist's office procedures are closely related to those of the secretary. However, secretarial duties play a more important role in the secretary's job which often requires a knowledge of medical or dental terms.

High school graduation is the minimum educational requirement for secretarial and office services. Training in office procedures and skill in typing, shorthand, and bookkeeping improve opportunities for employment. Courses in biology, chemistry, health education, and medical (or dental) terminology as well as ethics and personal relations are desirable as part of the education of medical (and dental) secretaries. Formal programs are available in some community colleges and in technical or vocational schools, and are supplemented by training and experience on the job.

Information on the employment of secretaries and other office assistants by the 200,000 physicians in office-based practice is not available.

Some idea of the number of aides might be arrived at from information provided by *Medical Economics* (*40*). The January 22, 1968, issue of this journal reported from their new survey that most solo M.D.'s have either one full-time aide or none, while half of the two-man and three-man partnerships, and well over half of the four-man partnerships have at least two full-time aides per M.D. This includes all full-time salaried office employees except physicians. When nurses and laboratory personnel are excluded, the average is probably about one employee per physician.

The American Association of Medical Assistants reported 13,000 members as of March 1968. Included are receptionists, secretaries, assistants, nurses, and technicians employed in the offices of Doctors of Medicine and in accredited hospitals.

The employment of *dental secretaries and receptionists* by nonsalaried dentists was reported by the American Dental Association (*41*) as follows:

Employment status	*1962*	*1965*
Full-time workers	13, 600	20, 900
Part-time workers	5, 900	4, 200

Optometrists' assistants (secretaries, receptionists, and aides) employed in 1967 are estimated at about 7,000. The Optometric Extension Program Foundation, Inc., enrolls approximately 1,200 assistants annually in 2-day workshops. In addition, some 900 persons are enrolled annually in a 4-week course of study for optometric assistants.

Other doctors in private practice as well as hospitals and related institutions also employ persons to provide secretarial and office services. The total number of secretarial and office personnel employed in 1967 was about 250,000. In 1960 the census reported 157,000 receptionists and secretaries employed in the health services industry (table 2, introduction).

REFERENCES

(*40*) Owens, A.: ***How many aides, how much to pay them.*** Medical Economics. January 1968.

(*41*) American Dental Association, Bureau of Economic Research and Statistics: 1965 survey of dental practice, IV, professional expenses; auxiliary personnel. *J. Am. Dent. A.* 72(5): 1185, May 1966. Also the 1962 survey.

CHAPTER 29

Social Work

Social work programs designed to meet the special needs of persons who are ill, disabled, aged, or crippled are one component of the many types of services concerned with the serious social problems of individuals and families. Of the 130,000 *social workers* employed in social welfare settings in the United States in 1967, approximately 20,200 were found in health and related programs (table 116).

According to the latest nationwide study of salaries and working conditions of social welfare manpower, approximately 4,500 persons were employed in medical settings and 7,200 in psychiatric settings in 1960. Three-fourths of these social workers were engaged in programs whose primary purpose is health services—in hospitals and their outpatient departments, in clinics which are independent of hospitals but provide outpatient diagnosis and other services, and in public health departments and voluntary organizations not centered in hospitals and clinics (table 117). More recent studies present selected characteristics of an estimated 5,800 social work staff who were in general and tuberculosis hospitals in 1964 and of 7,500 social workers employed in approximately 2,500 mental health establishments in 1963 (*42*) (table 118).

The 1966 PHS–AHA survey of hospitals indicated that 10,700 social workers were employed. A 1964 survey conducted by the American Hospital Association revealed that about 25 percent of the hospitals in the United States had social service departments (*43*). Social workers in hospitals and clinics work directly with patients and their families in helping them to cope with problems related to severe or long illness, recovery, and rehabilitation. They also contribute an understanding of significant social and emotional factors related to a patient's health problems and thus assist physicians and other health workers in the evaluation and treatment of the individual. They utilize community health agencies and other resources to assist the patient in adjustment to disability and to life in the community. In public health settings and in community mental health centers, social workers with skills in research, administration, and community organizational methods are being utilized in programs to develop conditions supportive of physical and mental health.

By the end of 1967, five States had enacted laws to protect the title of social worker from being assumed by persons without qualifications; they are California, New York, Oklahoma, Rhode Island, and Virginia. Puerto Rico requires a license to practice social work.

The educational requirement for full professional status is a master's degree, which requires completion of 2 years of graduate study in an accredited school of social work. It is estimated that about one out of five of all social workers meets this requirement. In 1960, the proportion was considerably higher in the health field—over half of the workers employed in medical settings and three-fourths of those in psychiatric settings had a master's degree (*44*).

In 1967, 64 graduate schools of social work in the United States were accredited by the Council on Social Work Education, with an additional six which were recently established working towards accreditation. In November 1967, 10,436 full-time students were enrolled, of whom 10,178 were in the master's degree program and 258 were in the post-master's degree program (tables 119 and 120).

Nearly, 600 colleges and universities offer courses with social welfare content at the undergraduate level (*45*). Of these, 220 are affiliated with the Council of Social Work Education. In 1965–66, 1,664 bachelor's degrees were identified with social work, social administration, or social welfare as the major subject (table 3, Introduction).

Many of these students go directly to graduate schools of social work, but more than half of them enter social welfare employment. In some settings, the service offered can be so delineated that selective use is made of social workers with graduate social work education; social workers with baccalaureate degrees and inservice training in social work; and social welfare aides or ancillary personnel. In medical and psychiatric settings, persons with baccalaureate degrees are more apt to be classified as social work assistants. These assistants receive additional on-the-job training in social work tasks under the supervision of a graduate social worker. The 1966 PHS–AHA survey indicated that 1,500 social work assistants were employed in hospitals.

Membership in the National Association of Social Workers (NASW)—48,641 individuals at the close of 1967—is open only to graduates and students of accredited graduate professional schools of social work. Persons employed in health and related programs may identify with two of the nine councils—2,410 members of the Medical and Health Services Council, or 6,178 members of the Mental Health and Psychiatric Services Council.

Eligibility requirements for membership in the Academy of Certified Social Workers are 2 years of membership in the NASW and 2 years of paid social work employment under the supervision of a member of the Academy. The Academy was founded in 1961 and had 33,000 members at the beginning of 1967 (*46*).

REFERENCES

(*42*) National Institute of Mental Health: Selected characteristics of social workers. *Mental Health Manpower Current Statistical and Activities Report,* No. 6. Public Health Service, U.S. Department of Health, Education, and Welfare, May 1965.

(*43*) Departmental Task Force on Social Work Education and Manpower: *Closing the Gap in Social Work Manpower.* Pub. No. 0–795–440. Office of the Undersecretary, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1966.

(*44*) Stewart, W. H., Pennell, M. Y., and Smith, L. M.: Medical and psychiatric social workers. *Health Manpower Source Book 12.* PHS Pub. No. 263, Sec. 12. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1961.

(*45*) National Commission for Social Work Careers: *What Every Recruiter Should Know: 1965–66 Facts About Social Work Manpower Supply and Demand.* New York.

(*46*) National Association of Social Workers: *Directory of Professional Social Workers,* 1967. New York. Second Edition.

Table 116. SOCIAL WELFARE WORKERS INCLUDING THOSE EMPLOYED IN HEALTH AND RELATED PROGRAMS: SELECTED YEARS, 1950 THROUGH 1967

Year	Total social welfare workers (estimated)	Persons employed in health and related programs			Year	Total social welfare workers (estimated)	Persons employed in health and related programs		
		Total	Medical settings	Psychiatric settings			Total	Medical settings	Psychiatric settings
1967	130, 000	20, 200	7, 200	13, 000	1960	105, 000	11, 700	4, 500	7, 200
1965	125, 000	17, 500	6, 300	11, 200	1950	----------	6, 200	3, 200	3, 000
1963	----------	15, 000	5, 500	9, 500					

Sources: 1950—U.S. Department of Labor, Bureau of Labor Statistics: *Social Workers in 1950. A Report on the Study of Salaries and Working Conditions in Social Work.* New York. American Association of Social Workers, Inc., 1950.

1960—U.S. Department of Labor, Bureau of Labor Statistics; National Social Welfare Assembly, Inc.; and U.S. Department of Health, Education, and Welfare: *Salaries and Working Conditions of Social Welfare Manpower in 1960.* New York. National Social Welfare Assembly, Inc., 1961.

1965—Departmental Task Force on Social Work Education and Manpower: *Closing the Gap in Social Work Manpower.* Pub. No. 0–795–440. Office of the Undersecretary, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1966.

1967—National Commission for Social Work Careers, National Association of Social Workers: *Manpower, A Community Responsibility, 1968 Annual Review.* New York, 1968.

1963, 1965, 1967—Public Health Service estimates of persons in health and related programs.

Table 117. ESTIMATED NUMBER OF FULL-TIME PERSONNEL SPECIALIZING IN MEDICAL AND PSYCHIATRIC SOCIAL WORK BY TYPE OF PROGRAM AND EMPLOYING AGENCY: 1960

Type of program	All agencies	State or local agencies					National agencies				
		Total	Government			Voluntary	Total	Federal			Voluntary
			Total	Public health	Other			Total	Public health	Other	
	Total medical and psychiatric social workers										
All programs	**11,701**	**9,956**	**5,523**	**1,009**	**4,514**	**4,433**	**1,745**	**1,575**	**131**	**1,444**	**170**
Health programs	**8,601**	**6,960**	**4,411**	**1,009**	**3,402**	**2,549**	**1,641**	**1,493**	**131**	**1,362**	**148**
Hospitals and their OPD	5,593	4,403	2,863	3	2,860	1,540	1,190	1,058	76	982	132
Independent clinics [1]	2,080	1,691	1,007	531	476	684	389	385	8	377	4
Other health programs [2]	928	866	541	475	66	325	62	50	47	3	12
Other programs	**3,100**	**2,996**	**1,112**	**—**	**1,112**	**1,884**	**104**	**82**	**—**	**82**	**22**
Rehabilitation services [3]	837	802	244	—	244	558	35	23	—	23	12
Public assistance	232	232	230	—	230	2	—	—	—	—	—
Other family services	544	540	31	—	31	509	4	—	—	—	4
Child welfare work	642	642	240	—	240	402	—	—	—	—	—
Teaching social work	205	205	66	—	66	139	—	—	—	—	—
Other programs [4]	640	575	301	—	301	274	65	59	—	59	6
	Medical social workers										
All programs	**4,494**	**3,752**	**1,880**	**277**	**1,603**	**1,872**	**742**	**590**	**80**	**510**	**152**
Health programs	**3,430**	**2,720**	**1,421**	**277**	**1,144**	**1,299**	**710**	**574**	**80**	**494**	**136**
Hospitals and their OPD	2,646	2,078	1,104	1	1,103	974	568	444	53	391	124
Independent clinics	321	219	97	64	33	122	102	102	2	100	—
Other health programs	463	423	220	212	8	203	40	28	25	3	12
Other programs	**1,064**	**1,032**	**459**	**—**	**459**	**573**	**32**	**16**	**—**	**16**	**16**
	Psychiatric social workers										
All programs	**7,207**	**6,204**	**3,643**	**732**	**2,911**	**2,561**	**1,003**	**985**	**51**	**934**	**18**
Health programs	**5,171**	**4,240**	**2,990**	**732**	**2,258**	**1,250**	**931**	**919**	**51**	**868**	**12**
Hospitals and their OPD	2,947	2,325	1,759	2	1,757	566	622	614	23	591	8
Independent clinics	1,759	1,472	910	467	443	562	287	283	6	277	4
Other health programs	465	443	321	263	58	122	22	22	22	—	—
Other programs	**2,036**	**1,964**	**653**	**—**	**653**	**1,311**	**72**	**66**	**—**	**66**	**6**

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[1] Clinics which are independent of hospitals that provide outpatient diagnosis and treatment of the sick.

[2] In public health departments and voluntary health organizations, in programs not centered in hospitals and clinics.

[3] Rehabilitation services of hospitals, clinics, sheltered workshops, rehabilitation centers, and other settings.

[4] Includes work with adult offenders, institutional care for the aged, other services to individuals or families, and community organization.

Source: Stewart, W. H., Pennell, M. Y., and Smith, L. M.: Medical and psychiatric social workers. *Health Manpower Source Book 12.* PHS Pub. No. 263, Sec. 12. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1961. Based on 1960 Bureau of Labor Statistics survey, including unpublished data.

Table 118. SOCIAL WORK STAFF IN GENERAL AND TUBERCULOSIS HOSPITALS: 1964

Type, ownership, and size of hospital	Total hospitals	Hospitals with social work staff		Estimated number of social work staff		Estimated number of graduate social workers	
		Number	Percent	Total	Percent hospital with staff	Total	Percent of social work staff
All hospitals	**6, 595**	**1, 219**	**18**	**5, 822**	**4. 8**	**3, 960**	**68**
Voluntary	4, 514	678	15	2, 560	3. 8	1, 754	69
State and local government	1, 679	330	20	2, 094	6. 3	1, 201	57
Federal Government	402	211	52	1, 168	5. 5	1, 005	86
General short-term hospitals	**6, 055**	**930**	**15**	**4, 803**	**5. 2**	**3, 354**	**70**
Voluntary	4, 290	575	13	2, 158	3. 8	1, 504	70
Under 100 beds	2, 561	75	3	162	2. 2	110	68
100–199 beds	849	92	11	230	2. 5	150	65
200–299 beds	460	157	34	386	2. 5	224	58
300–399 beds	235	126	54	468	3. 7	318	68
400 beds and over	185	125	68	912	7. 3	702	77
State and local government	1, 394	174	12	1, 642	9. 4	999	61
Under 200 beds	1, 205	45	4	139	3. 1	67	48
200–399 beds	107	59	55	364	6. 2	226	62
400 beds and over	82	70	85	1, 139	16. 3	706	62
Federal Government	371	181	49	1, 003	5. 5	851	85
Under 200 beds	218	42	19	94	2. 2	61	65
200–399 beds	66	55	83	220	4. 0	163	74
400 beds and over	87	84	97	689	8. 2	627	91
General long-term hospitals	**343**	**189**	**55**	**799**	**4. 2**	**501**	**63**
Voluntary	202	98	49	386	3. 9	239	62
State and local government	121	71	59	276	3. 9	135	49
Federal Government	20	20	100	137	6. 8	127	93
Tuberculosis hospitals	**197**	**100**	**51**	**220**	**2. 2**	**105**	**48**
Voluntary	22	5	23	16	3. 2	11	69
State and local government	164	85	52	176	2. 1	67	38
Federal Government	11	10	91	28	2. 8	27	96

Source: Pennell, M. Y. and Cooney, J. Jr.: Social Service Departments in Hospitals—1954 and 1964. *Hospitals:* Journal of the American Hospital Association, 41: 88. Mar. 16, 1967.

Table 119. ACCREDITED SCHOOLS OF SOCIAL WORK, STUDENTS AND GRADUATES: SELECTED YEARS, 1952-53 THROUGH 1967-68

Academic year	Schools	Enrollment in master's program		Students taking specified field of instruction		Awards granted for completion of program		Doctorate
		1st year	2d year	Medical	Psychiatric	2 years (master's degrees)	Certificate beyond 2 years	
1967-68	64	5, 527	4, 651	930	2, 094	4, 279	32	54
1966-67	63	5, 082	4, 253	754	2, 050	3, 693	33	56
1965-66	60	4, 506	3, 682	720	1, 938	3, 206	21	39
1962-63	56	3, 255	2, 608	568	1, 402	2, 318	29	30
1957-58	53	2, 308	1, 743	[1] 201	[1] 836	1, 612	19	20
1952-53	53	2, 138	1, 806			1, 946	13	8

[1] 2nd year students only.

Source: Council on Social Work Education: *Statistics on Social Work Education: November 1, 1967, and Academic Year 1966-1967.* New York, 1968. Also prior annual publications. Data for United States and Puerto Rico.

Table 120. LOCATION AND OWNERSHIP OF ACCREDITED SCHOOLS OFFERING MASTER'S PROGRAMS IN SOCIAL WORK AND NUMBERS OF STUDENTS AND GRADUATES: 1967

Location	School	Ownership	Students	Graduates
	Total, 64 schools		10, 178	4, 262
Ariz.	Arizona State University, Tempe	Public	74	23
Calif.	Fresno State College, Fresno	do	116	33
	Sacramento State College, Sacramento	do	71	29
	San Diego State College, San Diego	do	166	51
	University of California, Berkeley	do	315	149
	University of California, Los Angeles	do	135	64
	University of Southern California, Los Angeles	Private	148	61
Colo.	University of Denver, Denver	do	195	95
Conn.	University of Connecticut, Hartford	Public	153	53
D.C.	Catholic University of America, Washington	Private	130	44
	Howard University, Washington	do	202	202
Fla.	Florida State University, Tallahassee	Public	217	90
Ga.	Atlanta University, Atlanta	Private	107	38
	Georgia State College, Atlanta	Public	84	32
Hawaii	University of Hawaii, Honolulu	do	97	25
Ill.	Loyola University, Chicago	Private	132	42
	University of Chicago, Chicago	do	369	130
	University of Illinois, Urbana	Public	222	80
Ind.	Indiana University, Indianapolis	do	126	46
Iowa	University of Iowa, Iowa City	do	94	30
Kans.	University of Kansas, Lawrence	do	97	33
Ky.	University of Louisville, Louisville	do	130	51
La.	Louisiana State University, Baton Rouge	do	162	32
	Tulane University, New Orleans	Private	199	98
Md.	University of Maryland, Baltimore	Public	176	49
Mass.	Boston College, Boston	Private	123	61
	Boston University, Boston	do	127	62
	Simmons College, Boston	do	120	58
	Smith College, Northampton	do	135	56

Table 120. LOCATION AND OWNERSHIP OF ACCREDITED SCHOOLS OFFERING MASTER'S PROGRAMS IN SOCIAL WORK AND NUMBERS OF STUDENTS AND GRADUATES: 1967—Con.

Location	School	Ownership	Students	Graduates
Mich.	Michigan State University, East Lansing	Public	115	51
	University of Michigan, Ann Arbor	do	400	213
	Wayne State University, Detroit	do	232	111
Minn.	University of Minnesota, Minneapolis	do	104	62
Mo.	St. Louis University, St. Louis	Private	140	52
	University of Missouri, Columbia	Public	109	33
	Washington University, St. Louis	Private	177	80
Nebr.	University of Nebraska, Lincoln	Public	70	29
N.J.	Rutgers, The State University, New Brunswick	do	175	89
N.Y.	Adelphi University, Garden City	Private	159	51
	City University of New York, Hunter College, New York.	Public	224	51
	Columbia University, New York	Private	409	192
	Fordham University, New York	do	229	99
	New York University, New York	do	268	110
	State University of New York, SUNY at Buffalo, Buffalo.	Public	145	58
	Syracuse University, Syracuse	Private	122	47
	Yeshiva University, New York	do	87	36
N.C.	University of North Carolina, Chapel Hill	Public	130	59
Ohio	Ohio State University, Columbus	do	136	57
	Western Reserve University, Cleveland	Private	200	88
Okla.	University of Oklahoma, Norman	Public	109	36
Oreg.	Portland State College, Portland	do	73	27
Pa.	Bryn Mawr College, Bryn Mawr	Private	90	42
	University of Pennsylvania, Philadelphia	do	172	79
	University of Pittsburgh, Pittsburgh	do	208	85
P.R.	University of Puerto Rico, Rio Piedras	Public	162	37
Tenn.	University of Tennessee, Nashville	do	170	83
Tex.	Our Lady of the Lake College, San Antonio	Private	95	36
	University of Texas, Austin	Public	117	34
Utah	University of Utah, Salt Lake City	do	178	80
Va.	Richmond Professional Institute, Richmond	do	109	50
Wash.	University of Washington, Seattle	do	249	100
W. Va.	West Virginia University, Morgantown	do	90	41
Wis.	University of Wisconsin, Madison	do	146	57
	University of Wisconsin, Milwaukee	do	157	90

Source: Council on Social Work Education: *Statistics on Social Work Education: November 1, 1967, and Academic Year 1966-67*. New York. Annual publication.

CHAPTER 30

Specialized Rehabilitation Services

Several kinds of therapists, each with a specific area of knowledge and skill which may be adapted to the overall purpose of rehabilitation, may be employed to help the person who is physically or mentally disabled to regain as much capacity for self-help and independent living as possible. Information on occupational therapists and on physical therapists is presented in other chapters of this report. The specialists considered here are listed below, with estimates of the numbers of workers employed in 1967.

Occupation:	*Number employed*
Corrective therapist	1, 000–1, 200
Educational therapist	500
Manual arts therapist	900
Music therapist	2, 000
Recreation therapist	4, 000
Homemaking rehabilitation consultant	200

Thus the active manpower in these specialized rehabilitation services ranged between 8,600 and 8,800.

The five kinds of therapists listed above are members of the rehabilitation team which is headed by a physician. They follow specific treatment aims prescribed by the attending physician. Their employment is concentrated in hospitals and rehabilitation centers, usually those operated by the Veterans' Administration (VA) shown in table 121. They are also employed in schools with programs which utilize these specialized services.

The homemaking consultant may serve as a resource person for the rehabilitation team or provide direct counseling with handicapped individuals. Such consultants are likely to be employed by the Federal Extension Service or State departments of health, welfare, or vocational rehabilitation. Relatively few work for private health institutions, centers, or agencies.

Corrective Therapist

Corrective therapy is the treatment of patients by medically prescribed physical exercises and activities designed to strengthen and coordinate functions and to prevent muscular deconditioning resulting from long convalescence or inactivity due to illness. Corrective therapy is a prescribed service employed in the more advanced stages of rehabilitation in which functional training is required. The corrective therapist treats all diagnostic categories of patients on the prescription of a physician. He uses assistive, resistive, and active exercises, and in addition, may instruct patients in the use of orthopedic and prosthetic appliances.

Corrective therapist is the usual title used by those persons who work in hospitals, nursing homes, and rehabilitation centers, while those employed in educational institutions are known as *adapted physical educators*. The American Corrective Therapy Association, Inc. (710 members) estimates that corrective therapists (C.T.) numbered between 1,000 and 1,200 in 1967 compared with 700 in 1950 and 700 to 800 in 1965. Adapted physical educators (A.P.E.) may have totaled between 3,000 and 4,000 individuals in 1965 and 1967. The Veterans' Administration employs the largest number of personnel specifically identified as corrective therapists.

The recommended educational and clinical experience program for the corrective therapist qualifies the person for responsibilities in a hospital, nursing convalescent home, clinic, or educational institution. The minimum educational requirement is a baccalaureate in physical education from an accredited school, followed by a period of clinical training involving 400 to 600 hours in an approved affiliated hospital.

No information is available on the institutions that offer advanced training in corrective therapy—either through clinical practice, a master's degree, or a doctorate. Training centers are affiliated with 63 VA hospitals with 113 individuals trained in 1967.

The American Corrective Therapy Association is concerned with standards of education and clinical training. The American Board for Certification of Corrective Therapists is a component of the American Corrective Therapy Association, Inc. The Board passes on the qualifications of therapists and maintains a national register of those entitled to use the identification of a Certified Corrective Therapist (C.C.T.). By the end of 1967, more than 1,000 therapists had been certified.

Educational Therapist

Educational therapy is the utilization of academic teaching designed to develop the mental and physical capacities of hospitalized patients. The *educational therapist* (E.T.) administers medical treatment through the use of educational activities that are of significance to the patient. The instruction given at various educational levels may be accredited by recognized school authorities.

The educational therapist is a college graduate who has majored in education or physical education. In addition, 2 to 7 months of clinical training are required, either as inservice training or at certain training centers affiliated with professional schools. In 1967, 11 persons received clinical training at VA hospitals. No information is available on graduate degrees awarded in educational therapy.

The American Association for Rehabilitation Therapy with 650 members in 1967 represents both educational and manual arts therapists. Employed E.T.'s numbered about 150 in 1950, increasing to about 500 in 1965 and staying at about that level in 1967.

Manual Arts Therapist

Manual arts therapy is the professional use of industrial arts activities of vocational significance to assist in the restoration of patients to their fullest capacities within the limits of their abilities. The *manual arts therapist* administers a program of actual or simulated work situations that help the patient to prepare for an early return to family life and become a productive member of the community.

About 900 manual arts therapists were employed in hospitals and centers in 1967—the same number as in 1965, according to the American Association for Rehabilitation Therapy. In 1950, the number was probably one-third of the current supply.

The minimum qualification for employment is a college education, with a major in industrial arts, agriculture, or a related field. The degree is followed by a period of 2 to 7 months of clinical training, usually given as inservice training or at hospitals or rehabilitation centers affiliated with professional schools.

In 1967, 53 persons received clinical training at VA centers. No information is available on graduate degrees awarded in manual arts therapy.

Music Therapist

The professional application of the art of music for therapeutic purposes is relatively new and has a wider application in the treatment of mental illness than in physical illness. The *music therapist* uses instrumental or vocal music to bring about changes in behavior that can serve as a basis for improved mental and physical health.

Approximately 800 hospitals and similar institutions employ music therapists. A few public schools also include music therapy in their special education for exceptional children. In 1967, about 2,000 music therapists were employed, 850 of whom were members of the National Association for Music Therapy. In 1950, employed M.T.'s numbered about one-third as large.

Music majors may qualify by taking courses in music therapy. A baccalaureate in music therapy is offered by 13 schools, with 63 graduates in 1967–68 (tables 122 and 123). A master's degree program is offered by five universities. Three universities offer doctoral programs in which the individual may select a major in music therapy.

For employment as a qualified music therapist, the college graduate must complete a 6-month internship in an approved psychiatric hospital which is affiliated for clinical training with one of the approved schools.

Recreation Therapist

Therapeutic recreation is the specific use of recreational activity in the care, treatment, and rehabilitation of ill, handicapped, and aged persons within a directed program. A wide variety of programs are used in therapeutic recreation, since individuals differ in preferences, aptitudes, and reactions. Activities commonly found include: music, art, drama, sports, games, camping, outdoor and nature activities, cooking, sewing, hobbies, social clubs, and committees.

The *recreation therapist*, also known as the *therapeutic recreation specialist*, recreator, or adjunctive therapist, uses a program which is ordinarily associated with leisure as part of the treatment for people with physical and psychological handicaps, illnesses or conditions.

The number of persons employed as recreation therapists, in both private and governmental agencies, has increased from about 1,200 in 1959 to over 4,000 in 1967, as estimated by the National Therapeutic Recreation Society.

The 1966 PHS–AHA survey indicated that 3,800 recreation therapists were employed in hospitals. This estimate probably includes recreation therapy aides.

In 1966, the National Recreation and Park Association (14,000 members) was founded from a merger of several organizations. The following year, the National Therapeutic Recreation Society was formed as a branch of the Association with 1,000 members. In addition, there are persons employed in the recreational field who are not members of the society.

The therapeutic recreation staff is usually comprised of a director who holds a master's degree in recreation, plus staff members who may have a master's or bachelor's degree in recreation or in one of the activity specialties. Most therapeutic recreation staff give services directly to clients, but they also act as consultants to health or community agencies and function as supervisors, administrators, educators, and researchers, depending on the setting in which they work.

The National Therapeutic Recreation Society (NTRS) maintains a national registry at three levels, the "Director," which requires a master's degree plus 2 years' experience; the "Leader," which requires a bachelor's degree; and the "Aide," which requires a high school diploma plus 400 hours of inservice education. To date, the NTRS has registered some 300 persons in the above three categories. However, these figures do not reflect the total number of such personnel, since many States have separate registration plans which are not reported nationally.

In 1967, 124 colleges offered courses leading to a B.S. degree in recreation. These colleges graduated over 4,000 with a bachelor's degree, 300 with a master's and 20 with doctorates. A baccalaureate in recreation therapy is offered by 41 schools, a master's degree program by 25, and a doctor's degree program by 13 (table 124). Many States and other agencies offer stipends to encourage graduate study, and traineeships are available from the Rehabilitation Services Administration (RSA).

The National Therapeutic Recreation Society is currently developing a certification program to recognize facilities which meet standards for field work training of professional students in therapeutic recreation. Thus far, five institutions have been certified.

The recreational therapist may have the help of a *recreation therapy assistant* or *aide* in carrying out the program of rehabilitating patients in community and hospital programs. Three community colleges are known to be offering 2-year programs for the training of assistants (table 125).

Homemaking Rehabilitation Consultant

The specialist with a home economics background and training in occupational therapy can adapt the knowledge of home management, family finance, nutrition, and other home-related subjects to meet the needs of the handicapped person who has housekeeping responsibilities. The *homemaking rehabilitation consultant* may offer direct retraining in homemaking competencies to individuals or indirect counseling as a resource person for the rehabilitation team.

Rehabilitation of the physically handicapped in homemaking activities is of particular concern to the American Home Economics Association (AHEA). This Association administers traineeships provided by the Rehabilitation Services Administration (RSA) for home economists to study towards a master's or doctor's degree in the area of rehabilitation. In 1967–68, there were 12 trainees. Since the initiation of the program in 1963, a total of 49 persons have been awarded traineeships.

Homemaking rehabilitation consultants are college graduates, usually with an educational background in home economics or occupational therapy, followed by inservice or graduate training in the special education of the physically or mentally handicapped. Prior professional work experience may be in such fields as occupational therapy, physical therapy, dietetics or nutrition, or home economics. Practical experience in homemaking and child care is needed.

According to AHEA–RSA estimates, the number of persons employed as homemaking rehabilitation consultants in 1967 numbered more than 200.

Table 121. THERAPISTS EMPLOYED BY THE VETERANS' ADMINISTRATION AND NUMBER OF VA TRAINEES: 1965 AND 1967

Occupation	VA employees				Training center affiliations of VA hospitals 1967	Trainees in VA hospitals during calendar year 1967
	Dec. 31, 1965		Dec. 31, 1967			
	Therapist	Assistant	Therapist	Assistant		
Total	[1] 2,774	[2] 938	[3] 2,706	[4] 1,012	247	958
Corrective therapy	500	41	497	46	63	113
Educational therapy	156	13	147	12	18	11
General therapy	----------	28	----------	33	----------	----------
Manual arts therapy	390	314	387	319	46	53
Occupational therapy	501	287	488	312	38	381
Physical therapy	572	255	552	290	45	390
Recreational therapy, including music	655	----------	635	----------	37	10

[1] Includes 30 part-time employees.
[2] Includes 10 part-time employees.
[3] Includes 47 part-time employees.
[4] Includes 16 part-time employees.

Source: Veterans' Administration, Department of Medicine and Surgery, Reports and Statistics Service and Education Service.

Table 122. INSTITUTIONS OFFERING MUSIC THERAPY PROGRAMS AND GRADUATES: SELECTED YEARS, 1949–50 THROUGH 1967–68

Academic year	Bachelor's degree		Master's degree		Internship [1]	
	Schools	Graduates	Schools	Graduates	Institutions	Graduates
1967–68	13	63	5	7	34	56
1966–67	12	58	5	6	32	52
1965–66	11	52	5	4	31	48
1964–65	11	47	5	4	30	48
1963–64	11	31	5	2	28	38
1962–63	12	26	5	2	24	29
1961–62	8	18	5	3	20	20
1960–61	8	15	5	3	20	18
1959–60	7	13	5	4	18	17
1954–55	7	6	5	2	15	8
1949–50	3	4	2	3	10	7

[1] 6-month internship in an approved psychiatric hospital which is affiliated for clinical training with one of the approved schools. These internships are open to college graduates with a baccalaureate in music therapy and to music majors who have taken courses in music therapy.

Source: National Association for Music Therapy.

Table 123. LOCATION AND OWNERSHIP OF SCHOOLS OFFERING MUSIC THERAPY PROGRAMS AND NUMBERS OF GRADUATES: 1967–68

Location	School	Ownership	Graduates		
			Bachelor's degree	Master's degree	Internship
	Total, 11 schools		63	7	56
Calif	University of the Pacific, Stockton	Private	7	—	6
Fla	Florida State University, Tallahassee [1]	Public	5	1	4
Ind	Indiana University, Bloomington [1]	do	6	—	5
Kans	University of Kansas, Lawrence [1]	do	8	4	7
La	Loyola University, New Orleans	Private	8	—	7
Mich	Michigan State University, East Lansing	Public	7	2	7
	Western Michigan University, Kalamazoo	do	3	—	2
Mo	Lincoln University, Jefferson City	do	2	—	4
Ohio	Ohio University, Athens	do	4	—	3
Tex	Texas Women's University, Denton	do	4	—	3
Oreg	Williamette University, Salem	do	3	—	3
Wis	Alverno College, Milwaukee	Private	3	—	2
	University of Wisconsin, Milwaukee	Public	3	—	3

[1] These 3 universities offer doctoral programs with a major in music therapy.

Source: National Association for Music Therapy.

Table 124. LOCATION AND OWNERSHIP OF SCHOOLS OFFERING RECREATIONAL THERAPY PROGRAMS: 1967

Location	School	Ownership	Bachelor's program	Master's program	Doctor's program
	Total, 41 schools		41	25	13
Ala.	Schools of Health, Physical Education and Recreation, Livingston State College, Livingston.	Public	×	×	×
	Department of Recreation, University of Alabama, University.	do.	×	×	×
Calif.	Department of Recreation Education, California State College at Los Angeles, Los Angeles.	do.	×	×	
	Department of Recreation, San Diego State College, San Diego.	do.	×		
	Department of Recreation, San Fernando Valley State College, Northridge.	do.	×		
	Department of Recreation Education, San Francisco State College, San Francisco.	do.	×		
	Department of Recreation, San Jose State College, San Jose.	do.	×	×	
Fla.	Recreation Curriculum, Florida State University, Tallahassee.	do.	×	×	
Ga.	Division of Health, Physical Education and Recreation, Georgia Southern College, Statesboro.	do.	×		
Ill.	Department of Group Work and Recreation, George Williams College, Downer's Grove.	Private	×	×	
Ind.	Department of Recreation and Park Administration, Indiana University, Bloomington.	Public	×	×	×
	Recreation Education Section, Purdue University, Lafayette.	do.	×	×	×
Iowa	Recreation Leadership Program, University of Iowa, Iowa City.	do.	×	×	
Ky.	Recreation Curriculum, Eastern Kentucky University, Richmond.	do.	×		
	Department of Recreation, Morehead State University, Morehead.	do.	×		
	Division of Recreation, University of Kentucky, Lexington.	do.	×		
Mass.	School of Education, Boston University, Boston.	Private	×	×	×
	Recreation Education, Northeastern University, Boston Bouve College, Boston.	do.	×		
	Department of Health, Education, and Recreation, Springfield College, Springfield.	do.	×	×	
	Department of Recreation, University of Massachusetts, Amherst.	Public	×		
Mich.	Recreation Administration and Youth Leadership Curriculum, Michigan State University, East Lansing.	do.	×	×	
Minn.	Department of Recreation, Mankato State College, Mankato.	do.	×		
	Department of Recreation and Park Administration, University of Minnesota, Minneapolis.	do.	×	×	
Mo.	Department of Recreation and Park Administration, University of Missouri, Columbia.	do.	×	×	

Table 124. LOCATION AND OWNERSHIP OF SCHOOLS OFFERING RECREATIONAL THERAPY PROGRAMS: 1967—Continued

Location	School	Ownership	Bachelor's program	Master's program	Doctor's program
Nebr.	Department of Health, Physical Education and Recreation, Nebraska Wesleyan University, Lincoln.	Private	+	---------	---------
	Division of Recreation, Municipal University of Omaha, Omaha.	Public	+	---------	---------
N.Y.	Recreation Division, Columbia University, New York.	Private	---------	---------	+
	Department of Conservation, Cornell University, Ithaca.	do.	---------	---------	---------
	School of Education, New York University, New York.	do.	+	+	+
	Department of Recreation Education, SUNY College at Cortland, Cortland.	Public	+	+	---------
N.C.	Recreation Administration Curriculum, University of North Carolina, Chapel Hill.	do.	+	+	---------
N. Dak.	Department of Health, Physical Education, and Recreation, Jamestown.	Private	+	---------	---------
Ohio	Recreation Curriculum, Kent State University, Kent.	Public	+	---------	---------
Pa.	Department of Recreation and Parks Program, The Pennsylvania State University, University Park.	do.	+	+	+
Tex.	Recreation Curriculum, Texas Womans' University, Denton.	do.	+	+	+
Utah	Department of Recreation, Brigham Young University, Provo.	Private	+	+	---------
	Division of Recreation, University of Utah, Salt Lake City.	Public	+	+	+
	Department of Health, Physical Education, and Recreation, Utah State University, Logan.	do.	+	+	+
Va.	Department of Recreation Leadership, Richmond Professional Institute, Richmond.	do.	+	---------	---------
Wash.	Physical Education and Recreation Curriculum, Central Washington State College, Ellensburg.	do.	+	---------	---------
	Recreation Curriculum, University of Washington, Seattle.	do.	+	+	---------
Wis.	Recreation Curriculum, University of Wisconsin, Madison.	do.	+	+	+
Wyo.	Department of Health, Physical Education, and Recreation, University of Wyoming, Laramie.	do.	+	+	---------

Source: National Therapeutic Recreation Society.

Table 125. LOCATION AND OWNERSHIP OF SCHOOLS FOR RECREATIONAL THERAPY ASSISTANTS: 1967

Location	School [1]	Ownership
Calif.	Golden Gate College, Huntington Beach	Public.
Conn.	Northwestern Connecticut Community College, Winstead	Do.
N.Y.	State University of New York at Farmingdale	Do.

[1] Information not available on numbers of students and graduates.

Source: National Therapeutic Recreation Society.

CHAPTER 31

Speech Pathology and Audiology

Speech pathologists and audiologists are primarily concerned with disorders in the production, reception, and perception of speech and language. They help to identify persons who have such disorders and to determine the etiology, history, and severity of specific disorders through interviews and special tests. They facilitate optimal treatment through speech, hearing, and language, remedial or conservational procedures, counseling, and guidance. They also make appropriate referrals for medical or other professional attention.

Trends in numbers of speech pathologists and audiologists are indicated by the growth of membership in the American Speech and Hearing Association (ASHA). Membership increased from about 1,800 in 1950 to 3,700 in 1955; 6,200 in 1960; and over 12,000 in 1967 (table 126). However, about 2,000 of the ASHA members were students not employed.

Approximately 16,000 persons were employed as speech pathologists and audiologists in 1967, the large majority of whom are members of the association. Of the 8,236 active ASHA members responding to a 1966 survey, half were employed in elementary or secondary schools. As would be expected, a large majority of the membership are engaged in clinical work—either diagnostic or therapeutic (table 127).

Two Certificates of Clinical Competence are awarded by ASHA, one in speech pathology and one in audiology. Both require academic training at the master's degree level, 1 year of experience in the field, and the passing of a national examination. At the close of 1967, 4,343 persons held Certificates of Clinical Competence in speech pathology, and 853 in audiology.

A total of 271 schools offer programs in speech pathology and audiology. Of these, 81 offer training only at the preprofessional level (bachelor's degree); 135 offer the master's degree; and 55 award a doctorate. In the academic year 1966–67, about 5,900 degrees were awarded (tables 128 and 129).

Table 126. LOCATION OF SPEECH PATHOLOGISTS AND AUDIOLOGISTS WHO ARE MEMBERS OF THE AMERICAN SPEECH AND HEARING ASSOCIATION: 1967

Location	Members
All locations	[1] 12, 100
United States	11, 896
Alabama	92
Alaska	18
Arizona	79
Arkansas	37
California	1, 494
Colorado	273
Connecticut	224
Delaware	30
District of Columbia	140
Florida	300
Georgia	164
Hawaii	42
Idaho	21
Illinois	829
Indiana	284
Iowa	237
Kansas	223
Kentucky	90
Louisiana	186
Maine	28
Maryland	319
Massachusetts	281
Michigan	579
Minnesota	241
Mississippi	52
Missouri	266
Montana	41
Nebraska	103
Nevada	26
New Hampshire	23
New Jersey	432
New Mexico	48
New York	1, 269
North Carolina	107
North Dakota	64
Ohio	569
Oklahoma	149
Oregon	174
Pennsylvania	627
Rhode Island	43
South Carolina	47
South Dakota	21
Tennessee	176
Texas	520
Utah	91
Vermont	21
Virginia	200
Washington	260
West Virginia	39
Wisconsin	292
Wyoming	25
Puerto Rico	7
Foreign countries, APO	197

[1] A 1966 survey indicates that perhaps as many as one-fifth of these persons are not active in the profession.

Source: American Speech and Hearing Association: *1966 Directory*. Washington.

Table 127. PLACE OF EMPLOYMENT AND PROFESSIONAL ACTIVITY OF MEMBERS OF THE AMERICAN SPEECH AND HEARING ASSOCIATION: 1966

Characteristic	Number	Percent
Total respondents	[1] 10, 035	100. 0
Active in profession	8, 236	82. 1
Not active in profession	1, 799	17. 9
Student	790	7. 9
Not employed	1, 009	10. 0
Place of employment		
Total active in profession	8, 236	100. 0
College or university	1, 827	22. 2
Elementary or secondary school	4, 196	51. 0
Speech and hearing center not in college or university.	1, 378	16. 7
Other	835	10. 1
Professional activity		
Total active in profession	8, 236	100. 0
Clinical (therapy or diagnosis)	5, 753	69. 9
Supervision of clinical activity	396	4. 8
Teaching subject matter to communicatively handicapped.	258	3. 1
Teaching in college or university	963	11. 7
Administration	430	5. 2
Research	264	3. 2
Other	172	2. 1

[1] An additional 2,746 persons did not respond.

Source: Castle, W. E.: The 1966 membership of ASHA—survey results. *Asha*, A Journal of the American Speech and Hearing Association. 9(6): 219–220, June 1967.

Table 128. SCHOOLS OFFERING PROGRAMS IN SPEECH PATHOLOGY AND AUDIOLOGY AND GRADUATES: SELECTED YEARS, 1953–54 THROUGH 1966–67

Academic year	Schools	Graduates			
		Total	Bachelor's	Master's	Doctor's
1966–67 [1]		5, 864	3, 879	1, 785	200
1965–66 [1]	247	4, 716	3, 173	1, 407	136
1964–65	240	3, 688	2, 568	1, 020	100
1963–64		3, 293	2, 416	776	101
1962–63	194	3, 133	2, 322	730	81
1961–62	194	2, 503	1, 893	543	67
1960–61	204	2, 259	1, 662	502	95
1959–60 [1]		2, 193	1, 630	481	82
1958–59	193	1, 935	1, 458	421	56
1957–58		1, 694	1, 281	359	54
1953–54		955	662	260	33

[1] Estimated number of graduates.

Source: The status of professional training in speech pathology and audiology—1963. *Asha*, A Journal of the American Speech and Hearing Association. 5(12): 865–1001, December 1963. Updated by the Association.

Table 129. LOCATION OF SCHOOLS OFFERING PROGRAMS IN SPEECH PATHOLOGY AND AUDIOLOGY: 1967–1968

Location [1]	School	Highest degree offered			Location [1]		Highest degree offered		
		Bachelor's	Master's	Doctor's			Bachelor's	Master's	Doctor's
Total	271	81	135	55	Missouri	12	5	4	3
					Montana	1	—	1	—
Alabama	3	—	3	—	Nebraska	3	1	2	—
Arizona	2	—	2	—	Nevada	1	1	—	—
Arkansas	2	1	1	—	New Hampshire	1	1	—	—
California	24	6	16	2	New Jersey	7	—	7	—
Colorado	6	1	3	2	New Mexico	3	—	3	—
Connecticut	2	—	2	—	New York	22	5	11	6
District of Columbia	5	2	3	—	North Carolina	7	4	3	—
Florida	5	2	1	2	North Dakota	3	—	3	—
Georgia	2	—	1	1	Ohio	9	1	4	4
Hawaii	1	—	1	—	Oklahoma	8	3	4	1
Idaho	1	—	1	—	Oregon	7	3	3	1
Illinois	14	5	6	3	Pennsylvania	10	5	1	4
Indiana	4	—	2	2	South Carolina	1	1	—	—
Iowa	4	2	1	1	South Dakota	3	1	2	—
Kansas	6	—	2	4	Tennessee	5	—	4	1
Kentucky	5	4	—	1	Texas	17	4	11	2
Louisiana	11	7	3	1	Utah	3	—	2	1
Maine	1	1	—	—	Vermont	1	—	1	—
Maryland	5	2	1	2	Virginia	4	3	—	1
Massachusetts	4	—	3	1	Washington	8	3	4	1
Michigan	9	—	5	4	West Virginia	2	1	—	1
Minnesota	5	2	2	1	Wisconsin	8	3	4	1
Mississippi	3	1	1	1	Wyoming	1	—	1	—

[1] No schools in Alaska, Delaware, and Rhode Island.

Source: American Speech and Hearing Association.

CHAPTER 32

Veterinary Medicine

Veterinary medicine deals with the prevention, cure, or alleviation of disease and injury in animals. In addition to treating sick and injured animals, veterinarians give advice regarding the care and breeding of animals and help prevent the outbreak and spread of diseases among them, by physical examinations, tests, and vaccinations. Thus, the profession shields the human population from scores of animal diseases which may affect man, such as brucellosis, leptospirosis, rabies, and tuberculosis.

The number of veterinarians in the United States has increased from 15,800 in 1950, to 25,500 in 1967 (table 130). Included in the count are Federal and non-Federal veterinarians in active practice as well as those who are retired or not in practice. Probably 24,200 (95 percent) are currently active in their profession.

More than half of the veterinarians go into private practice. Most of them handle all kinds of domestic animals. An additional number work directly in the regulatory and public health aspects of veterinary medicine for Federal, State, or local governments, and in other types of practice (table 131). Some medical schools now employ veterinarians as full-time staff members in teaching and research.

Veterinary medical specialty organizations recognized by the American Veterinary Medical Association are: American Board of Veterinary Public Health (111 specialists); American Board of Veterinary Radiology (20); American Board of Veterinary Toxicology (8); American College of Laboratory Animal Medicine (106); American College of Veterinary Microbiologists (76); and American College of Veterinary Surgeons (36).

A license is required for the practice of veterinary medicine in all States and the District of Columbia. To obtain a license, an applicant must be a graduate of an approved veterinary school and pass a State board examination. A few States also require some practical experience under the supervision of a licensed veterinarian.

For positions in public health, research, laboratory animal medicine, or teaching, the master's or Ph. D. degree in a field such as pathology, public health, or bacteriology may be required, in addition to the degree of Doctor of Veterinary Medicine (D.V.M.).

The minimum time required to earn the D.V.M. is 6 years beyond high school. This period consists of 2 to 4 years of undergraduate college curricula and 4 years of veterinary medicine in one of the 18 approved schools. In the academic year 1967–68, there were 4,623 students enrolled, of whom 1,064 were expected to graduate that year (tables 132 and 133).

Some graduates of foreign veterinary schools serve as interns and residents in this country and then establish practices here.

Table 130. LOCATION OF VETERINARIANS AND MEMBERSHIP STATUS IN THE AMERICAN VETERINARY MEDICAL ASSOCIATION: JANUARY 1968

Location	Total veterinarians	AVMA members	Nonmembers
United States	25, 466	18, 223	7, 243
Alabama	430	280	150
Alaska	17	12	5
Arizona	222	156	66
Arkansas	212	127	85
California	2, 446	1, 805	641
Colorado	566	409	157
Connecticut	231	198	33
Delaware	72	56	16
District of Columbia	117	96	21
Florida	756	532	224
Georgia	591	398	193
Hawaii	53	46	7
Idaho	163	124	39
Illinois	1, 352	990	362
Indiana	852	610	242
Iowa	1, 288	871	417
Kansas	611	429	182
Kentucky	338	266	72
Louisiana	289	200	89
Maine	101	82	19
Maryland	599	493	106
Massachusetts	358	300	58
Michigan	930	693	237
Minnesota	794	514	280
Mississippi	204	136	68
Missouri	781	546	235
Montana	192	150	42
Nebraska	492	320	172
Nevada	75	61	14
New Hampshire	81	70	11
New Jersey	526	416	110
New Mexico	149	120	29
New York	1, 572	1, 108	464
North Carolina	389	289	100
North Dakota	104	80	24
Ohio	1, 278	891	387
Oklahoma	415	296	119
Oregon	316	232	84
Pennsylvania	997	693	304
Rhode Island	42	25	17
South Carolina	193	129	64
South Dakota	230	167	63
Tennessee	345	246	99
Texas	1, 494	1, 022	472
Utah	141	98	43
Vermont	88	66	22
Virginia	515	382	133
Washington	614	419	195
West Virginia	92	65	27
Wisconsin	668	447	221
Wyoming	85	62	23

Source: American Veterinary Medical Association.

Table 131. TYPE OF PRACTICE OF VETERINARIANS: JANUARY 1968

Type of practice	Number	Percent
Total veterinarians	25, 466	100. 0
Private practice	16, 065	63. 1
Large animal	1, 760	6. 9
Small animal	5, 788	22. 7
Mixed	8, 517	33. 4
Other practice	7, 268	28. 5
Regulatory veterinary medicine	1, 734	6. 8
Veterinary public health	485	1. 9
Military veterinary services	816	3. 2
Other including laboratory services	4, 233	16. 6
Retired, not in practice, or status not reported	2, 133	8. 4

Source: American Veterinary Medical Association.

Table 132. VETERINARY MEDICAL SCHOOLS, STUDENTS, AND GRADUATES: SELECTED YEARS, 1949-50 THROUGH 1967-68

Academic year	Schools	Students	Graduates[1]	Academic year	Schools	Students	Graduates[1]
1967-68	18	4,623	1,064	1961-62	18	3,528	819
1966-67	18	4,388	963	1960-61	18	3,497	824
1965-66	18	4,119	910	1959-60	18	3,464	826
1964-65	18	3,874	877	1954-55	17	3,419	817
1963-64	18	3,727	834	1949-50	17	3,132	695
1962-63	18	3,632	830				

[1] Senior students.

Source: *J. Am. Vet. M.A.* 151(12): 1928, Dec. 15, 1967. Also prior annual Dec. 15 issues of the Journal.

Table 133. LOCATION AND OWNERSHIP OF SCHOOLS OF VETERINARY MEDICINE AND NUMBERS OF STUDENTS AND GRADUATES: 1967-68

Location	School	Ownership	Students	Graduates[1]
	Total, 18 schools		4,623	1,064
Ala.	Auburn University School of Veterinary Medicine, Auburn.	Public	387	99
	Tuskegee Institute School of Veterinary Medicine, Tuskegee Institute.	Private	111	15
Calif.	University of California School of Veterinary Medicine, Davis.	Public	282	54
Colo.	Colorado State University College of Veterinary Medicine, Fort Collins.	do.	278	63
Ga.	University of Georgia School of Veterinary Medicine, Athens.	do.	235	53
Ill.	University of Illinois College of Veterinary Medicine, Urbana.	do.	258	51
Ind.	Purdue University School of Veterinary Science and Medicine, Lafayette.	do.	213	44
Iowa	Iowa State University College of Veterinary Medicine, Ames.	do.	278	67
Kans.	Kansas State University School of Veterinary Medicine, Manhattan.	do.	312	75
Mich.	Michigan State University College of Veterinary Medicine, East Lansing.	do.	287	59
Minn.	University of Minnesota College of Veterinary Medicine, St. Paul.	do.	233	55
Mo.	University of Missouri School of Veterinary Medicine, Columbia.	do.	191	29
N.Y.	State University of New York, Veterinary College at Cornell University, Ithaca.	do.	231	59
Ohio	Ohio State University College of Veterinary Medicine, Columbus.	do.	318	79

See footnotes at end of table.

Table 133. LOCATION AND OWNERSHIP OF SCHOOLS OF VETERINARY MEDICINE AND NUMBERS OF STUDENTS AND GRADUATES: 1967–68—Continued

Location	School	Ownership	Students	Graduates[1]
Okla.	Oklahoma State University College of Veterinary Medicine, Stillwater.	do.	181	48
Pa.	University of Pennsylvania School of Veterinary Medicine, Philadelphia.	Private	280	60
Tex.	Texas A. & M. University College of Veterinary Medicine, College Station.	Public	360	[2] 104
Wash.	Washington State University College of Veterinary Medicine, Pullman.	do.	188	50

[1] 4th-year students.

[2] 3d-year students under trimester system.

Source: *J. Am. Vet. M.A.* 151(12): 1928, Dec. 15, 1967.

CHAPTER 33

Vision Care

The responsibility for visual services and eye care is divided among three major categories of health personnel. Ophthalmologists (oculists) are physicians who specialize in the medical and surgical treatment of eye diseases or abnormal conditions including refractive errors. They may prescribe drugs, lenses, or other treatment to remedy these conditions. Optometrists specialize in vision analysis. They examine the eyes, prescribe lenses and other vision aids, and provide visual training and orthoptics or other treatment; however, they do not treat eye diseases or perform surgery. Dispensing opticians fit and adjust eyeglasses according to prescriptions written by ophthalmologists or optometrists; they do not examine eyes or prescribe treatment.

Active personnel with special training for safeguarding or improving vision include about 8,900 ophthalmologists (M.D. and D.O.), 17,000 optometrists (O.D.) and 23,000 opticians and optical technicians. In addition, there are more than 400 orthoptists who assist ophthalmologists. Statistics on ophthalmologists are included in chapter 18 on medicine and osteopathy; statistics on optometrists, opticians, optical technicians, and orthoptists are given here. No information is available on the emerging occupations of technicians serving ophthalmologists and optometrists. (See also ch. 28 for optometrists' office assistants.)

Optometrists

Optometry is the profession specifically licensed in all States to care for human vision. A Doctor of Optometry is educated and trained to examine the eyes and related structures to determine the presence of vision impairments, eye diseases, vision malfunctions related to educational difficulties, or other abnormalities. He prescribes and adapts lenses, contact lenses, or other optical aids, and utilizes vision training to preserve, restore, and improve vision efficiency.

The number of active *optometrists* in the United States has been relatively constant for many years—about 17,000. This estimate was provided by the American Optometric Association (AOA) which has 14,500 active members. The State distribution in table 134 includes optometrists who are active in the profession as well as those not in practice.

An estimate based on respondents to a 1965 AOA survey showed that nearly three-fourths of the active optometrists are in private practice, either self-employed or associated with other optometrists in a group practice. Other optometrists work for established practitioners, health clinics, hospitals, optical instrument manufacturers, in retail establishments or government agencies.

All States and the District of Columbia require a license for the practice of optometry. To qualify for a license, the applicant must be a graduate of an accredited school of optometry and pass a State Board examination. Two States (Delaware and Rhode Island) require a 6-month internship and Mississippi, 1 year of experience.

All 10 accredited colleges of optometry in the United States require a 6-year curriculum leading to a Doctor of Optometry degree (O.D.), which includes 2 years of preoptometry education at an accredited college and 4 years of professional optometry training. Some schools are presently in the transition stage of changing from the earlier requirement of 3 years to the 4-year program.

In the fall of 1967, a total of 1,976 students were enrolled in their first 4 years in the 10 approved colleges. During the academic year ending June 1967, 467 graduates were awarded an O.D. degree (tables 135 and 136).

Opticians and Optical Technicians

An optician makes and fits eyeglasses prescribed by an ophthalmologist or optometrist to correct a patient's visual defects. The mechanical grinding and polishing of the lenses and assembling in a frame are done by an optical technician, also known as an optical laboratory mechanic, lens grinder, polisher, surfacer, edger, benchman, or assembler. Then the *dispensing optician* fits and adjusts the glasses to the individual's requirements. In some States the dispensing optician may fit contact lenses and is sometimes called a *contact lens technician.*

Probably upwards of 23,000 *opticians and optical technicians* were employed throughout the country in 1967—the same as estimated for 1965. The census findings indicated that 19,200 persons in 1950 and 20,300 in 1960 were employed as dispensing opticians and optical technicians (table 137). The Guild of Prescription Opticians estimated that the 8,000 active opticians include almost 1,000 proprietors of retail optical establishments, nearly 5,000 dispensers working in shops, about 1,500 employed by ophthalmologists and optometrists, and more than 500 employed in wholesaling and manufacturing, hospitals, government, and other industries.

The Guild also estimated that of the approximately 15,000 optical technicians, more than 10,000 are employed in prescription departments of wholesale optical laboratories or by manufacturers of ophthalmic goods. Probably as many as 4,000 are employed in retail optical shops, and fewer than 1,000 by ophthalmologists and optometrists.

Dispensing opticians are required to have a license in 15 States. In addition, California and Hawaii license opticianry establishments. In both Connecticut and New Jersey, a license is required for optical technicians.

In the States requiring a license to practice opticianry, high school graduates usually prepare for this occupation through apprenticeship programs which may last from 1 to 4 years. An alternate method of entering this occupation is through completion of a 1- or 2-year formal program in ophthalmic dispensing or optical technology in a community college, military, or technical school. Six schools which grant an associate degree in ophthalmic dispensing have been certified by the American Board of Opticianry or have received tentative certification since they have not yet had a graduating class (table 138).

Orthoptists

Many ophthalmologists have assistants known as orthoptists who work under their supervision in the specialized field of teaching patients certain exercises which help to overcome the handicap of crossed eyes. (The optometrist who specializes in visual training may have the similar help of an assistant.)

Approximately 400 individuals were employed as *orthoptists* in 1967—the same as estimated for 1965. The great majority work in the private offices of opthalmologists while a few are employed in hospitals and clinics. The estimated number was provided by the American Orthoptic Council. The American Association of Certified Orthoptists had 350 members in 1965.

Specialized training in orthoptics is available to persons with at least 2 years of college education. The training involves enrolling in any one of the 10 training centers or one of the 14 preceptorships listed in table 139. Fifteen months of training are required, including 2 months in the basic course offered by the American Orthoptic Council. A certificate is issued by the Council to qualified students who successfully pass an examination conducted by the Council.

Table 134. LOCATION OF LICENSED OPTOMETRISTS: DECEMBER 1967

Location	Number	Location	Number
United States	[1] 20, 565	Missouri	487
		Montana	97
Alabama	193	Nebraska	178
Alaska	17	Nevada	40
Arizona	127	New Hampshire	73
Arkansas	159	New Jersey	718
California	2, 512	New Mexico	72
Colorado	190	New York	1, 858
Connecticut	270	North Carolina	348
Delaware	33	North Dakota	78
District of Columbia	84	Ohio	1, 032
Florida	514	Oklahoma	267
Georgia	281	Oregon	313
Hawaii	66	Pennsylvania	1, 348
Idaho	94	Rhode Island	144
Illinois	1, 940	South Carolina	158
Indiana	548	South Dakota	95
Iowa	371	Tennessee	325
Kansas	252	Texas	830
Kentucky	238	Utah	88
Louisiana	240	Vermont	37
Maine	126	Virginia	299
Maryland	203	Washington	400
Massachusetts	833	West Virginia	163
Michigan	788	Wisconsin	458
Minnesota	410	Wyoming	40
Mississippi	130		

[1] An estimated 17,000 of these optometrists are active in the profession.

Source: *The Blue Book of Optometrists.* Chicago. Professional Press, Inc., 1968. Also prior biennial editions of this directory.

Table 135. SCHOOLS OF OPTOMETRY, STUDENTS AND GRADUATES: SELECTED YEARS, 1950–51 THROUGH 1967–68

Academic year	Schools	Students [1]	Graduates
1967–68	10	1,994	----------
1966–67	10	1,876	484
1965–66	10	1,741	[2] 384
1964–65	10	1,582	406
1963–64	10	1,364	346
1962–63	10	1,263	359
1961–62	10	1,180	299
1960–61	10	1,101	316
1959–60	10	1,122	364
1956–57	10	1,175	355
1953–54	12	1,631	674
1950–51	10	2,435	961

[1] Fall enrollment of undergraduate students in last 3 or 4 years of optometric education.

[2] Several schools revised requirements from 3 to 4 years for an optometric education.

Source: American Optometric Association.

Table 136. LOCATION AND OWNERSHIP OF ACCREDITED SCHOOLS OF OPTOMETRY: 1967

Location	School	Ownership	Students [1]	Graduates [2]
	Total, 10 schools		1,994	484
Calif.	Los Angeles College of Optometry, Los Angeles	Private	171	52
	University of California, School of Optometry, Berkeley	Public	123	[3] 29
Ill.	Illinois College of Optometry, Chicago	Private	270	69
Ind.	Indiana University, Division of Optometry, Bloomington.	Public	125	28
Mass.	Massachusetts College of Optometry, Boston	Private	158	43
Ohio	Ohio State University, School of Optometry, Columbus	Public	168	[3] 13
Oreg.	Pacific University, College of Optometry, Forest Grove	Private	162	67
Pa.	Pennsylvania College of Optometry, Philadelphia	do.	348	55
Tenn.	Southern College of Optometry, Memphis	do.	286	106
Tex.	University of Houston, College of Optometry, Houston	Public	183	22

[1] Fall enrollment of undergraduate students in last 3 or 4 years of optometric education.

[2] Graduates as of June 1967.

[3] Small number of graduates from the University of California and Ohio State University due to change from 3- to 4-year program.

Source: American Optometric Association.

Table 137. LOCATION OF DISPENSING OPTICIANS AND OPTICAL TECHNICIANS IN RELATION TO POPULATION: APRIL 1, 1960

Location	Number employed	Rate per 100,000 population	Location	Number employed	Rate per 100,000 population
United States	[1] 20, 349	11. 3	Missouri	521	12. 1
			Montana	72	10. 7
Alabama	154	4. 7	Nebraska	177	12. 5
Alaska	24	10. 6	Nevada	16	5. 6
Arizona	98	7. 5	New Hampshire	123	20. 3
Arkansas	53	3. 0	New Jersey	657	10. 8
California	1, 614	10. 3	New Mexico	64	6. 7
Colorado	228	13. 0	New York	3, 722	22. 2
Connecticut	370	14. 6	North Carolina	269	5. 9
Delaware	36	8. 1	North Dakota	53	8. 4
District of Columbia	64	8. 4	Ohio	981	10. 1
Florida	510	10. 3	Oklahoma	169	7. 3
Georgia	236	6. 0	Oregon	177	10. 0
Hawaii	61	9. 6	Pennsylvania	1, 364	12. 1
Idaho	22	3. 3	Rhode Island	229	26. 6
Illinois	1, 213	12. 0	South Carolina	116	4. 9
Indiana	356	7. 6	South Dakota	52	7. 6
Iowa	213	7. 7	Tennessee	168	4. 7
Kansas	209	9. 6	Texas	1, 010	10. 5
Kentucky	225	7. 4	Utah	124	13. 9
Louisiana	171	5. 3	Vermont	49	12. 6
Maine	31	3. 2	Virginia	550	13. 9
Maryland	358	11. 5	Washington	304	10. 7
Massachusetts	1, 428	27. 7	West Virginia	148	8. 0
Michigan	629	8. 0	Wisconsin	361	9. 1
Minnesota	488	14. 3	Wyoming	8	2. 4
Mississippi	74	3. 4			

[1] Many of the 2,500 proprietors of retail optical establishments were also trained as dispensing opticians or optical technicians (lens grinders and polishers and other laboratory mechanics).

Source: Prindle, R. A., and Pennell, M. Y.: Industr upation data from the 1960 census. *Health Manpower Source Book 17*. PHS Pub. No. 263, Section 17. Public Health Service, U.S. of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1963.

Table 138. LOCATION AND OWNERSHIP OF INSTITUTIONS OFFERING TRAINING PROGRAMS FOR OPTICIANS AND NUMBERS OF GRADUATES: 1967

Location	Institution	Ownership	Graduates
	Total, 6 institutions		73
Calif	Los Angeles City College, Los Angeles	Public	3
Mass	Worcester Industrial Technical Institute, Worcester	do	13
Mich	Ferris State College, Technical Terminal Division, Big Rapids	do	13
Minn	Eveleth Area Vocational-Technical School, Eveleth [1]	do	7
N.Y.	City University of New York, New York City Community College of Applied Arts and Sciences, New York City.	do	
	Erie County Technical Institute, Optical Technology Department, Buffalo.	do	37

[1] Not listed by the A.B.O. accrediting body.

Sources: American Board of Opticianry and Guild of Prescription Opticians.

Table 139. LOCATION AND OWNERSHIP OF ACCREDITED TRAINING CENTERS AND PRECEPTORSHIPS IN ORTHOPTICS AND NUMBERS OF STUDENTS: FEBRUARY 1966 [1]

Location	Center or preceptorship	Ownership	Students
	10 training centers		**26**
Ga.	Emory University Orthoptic Training School, Emory University Clinic, Atlanta.	Private	3
La.	Tulane University School of Medicine, Orthoptic-Pleoptic Clinic, Department of Ophthalmology, New Orleans.	do.	3
Mass.	Harvard Medical School, Massachusetts Eye and Ear Infirmary, Boston.	do.	2
Mich.	Wayne State University School of Medicine, Kresge Eye Institute, Detroit.	Public-private	2
Mo.	University of Missouri School of Medicine, Section of Ophthalmology, Columbia.	Public	2
N.Y.	New York Eye and Ear Infirmary, School of Orthoptics, New York.	Private	4
	New York University School of Medicine, Department of Ophthalmology, New York.	do.	3
Ohio	Ohio State University Hospital, Department of Ophthalmology, Columbus.	Public	1
Okla.	University of Oklahoma Medical Center, Orthoptic Clinic, Oklahoma City.	do.	2
Tex.	Baylor University College of Medicine, Methodist Hospital, Pleoptic-Orthoptic Unit, Houston.	Private	4
	14 preceptorships		**24**
Calif.	University of California San Francisco Medical Center, University of California Hospital, San Francisco.	Public	1
Fla.	University of Florida College of Medicine, Department of Ophthalmology, Gainesville.	do.	1
	University of Miami School of Medicine, Bascon Palmer Eye Institute, Miami.	Private	2
Iowa	University of Iowa, University Hospitals, Department of Opthalmology, Iowa City.	Public	3
Md.	Johns Hopkins University School of Medicine, Johns Hopkins Hospital, Wilmer Institute, Baltimore.	Private	2
Mich.	Office of Edmond L. Cooper, M.D., Royal Oak.	do.	1
	University of Michigan Medical Center, University Hospital, Department of Ophthalmic Surgery, Ann Arbor.	Public	1
Mo.	St. Louis Ophthalmic Laboratory, St. Louis.	Private	2
	Washington University School of Medicine, Department of Ophthalmology, St. Louis.	do.	2
N.Y.	Buffalo Eye and Ear Hospital, Buffalo Orthoptic Clinic, Buffalo.	do.	3
	Presbyterian Medical Center, Institute of Ophthalmology, New York.	do.	3
	State University of New York, Downstate Medical Center, Division of Ophthalmology, Brooklyn.	Public	1
Ohio	Cleveland Clinic Foundation, Cleveland.	Private	1
Wis.	Milwaukee Ophthalmic Institute, Milwaukee Curative Workshop, Milwaukee.	do.	1

[1] Later data not available.

Source: American Orthoptic Council.

CHAPTER 34

Vocational Rehabilitation Counseling

Rehabilitation services are required to help persons with physical or mental disabilities to return as fully as possible to normal living. Primary concern with repairing or compensating for the damage of illness or accident rests with the physician who may have the help of a variety of other health workers. For vocational guidance, training, and placement, however, the major responsibility rests with the rehabilitation counselor.

The vocational *rehabilitation counselor* is concerned with evaluating the vocational potential of the individual. He tries to match the abilities of the client with a suitable job when the time comes for starting work—either in his former position or in the one for which job training or retraining becomes a part of rehabilitation. Some counselors specialize in services for the blind, paraplegics, the mentally ill, the retarded, or other specific groups. They not only provide patient counseling, but engage in community activities to interest prospective employers, educators, and others in the problems of handicapped persons and in the benefits of rehabilitation.

All 50 States have rehabilitation programs financed jointly by Federal and State funds. More than 5,900 rehabilitation counselor positions were in existence in these State programs at the close of 1967; however, 625 of these positions were vacant (table 140). They are based in the agencies' headquarters or field service stations, in mental hospitals, rehabilitation centers, sheltered workshops, and other special settings.

In addition, an estimated 2,500 rehabilitation counselors were employed in 1967 in Veterans' Administration hospitals and in other public and private hospitals, in special schools, and in voluntary health agencies and other organizations with rehabilitation interests.

The minimum educational requirement for employment as a rehabilitation counselor is generally a bachelor's degree, preferably with a major subject of psychology, social welfare, or education. Specialized professional education is open for college graduates who have had some experience in rehabilitation counseling or in such related fields as vocational guidance, personnel work, or social work. Probably about two-thirds percent of the 7,800 rehabilitation counselors currently employed have had some graduate training.

In 1967–68, 65 universities offered graduate programs in rehabilitation counseling (tables 141 and 142). The graduate programs generally require 1½ to 2 academic years for a master's degree and an additional 2 or 3 years for a doctorate. The courses include human behavior and personality functioning, rehabilitation problems, counseling principles and techniques, information on occupations, and methods of developing job resources for the disabled. In 1967, 638 persons were awarded graduate degrees (or certificates) in rehabilitation counseling.

Table 140. VOCATIONAL REHABILITATION COUNSELORS: SELECTED YEARS, 1950 THROUGH 1967

Year	Estimated number of counselors	Employed in State programs	Employed in hospitals, schools, or other settings [1]
1967	7, 800	5, 300	2, 500
1965	6, 200	4, 200	2, 000
1960	3, 000	2, 000	1, 000
1955	1, 800	1, 200	600
1950	1, 500	1, 000	500

[1] Includes those employed by voluntary health agencies and other organizations with rehabilitation interests.

Source: U.S. Department of Health, Education, and Welfare, Social and Rehabilitation Service, Rehabilitation Services Administration, Division of Training.

Table 141. SCHOOLS OFFERING GRADUATE TRAINING PROGRAMS IN REHABILITATION COUNSELING AND GRADUATES: SELECTED YEARS, 1949–50 THROUGH 1966–67

Academic year	Schools	Students	Graduates	Academic year	Schools	Students	Graduates
1967–68	68	[1] 1,359	[1] 800	1961–62	32	646	231
1966–67	65	1,684	638	1960–61	34	565	241
1965–66	39	1,140	559	1959–60	29	566	243
1964–65	39	954	467	1954–55	4	43	5
1963–64	34	857	415	1949–50	3	----------	----------
1962–63	33	738	281				

[1] Estimated.

Source: U.S. Department of Health, Education, and Welfare, Social and Rehabilitation Service, Rehabilitation Services Administration, Division of Training. Data for United States and Puerto Rico.

Table 142. LOCATION AND OWNERSHIP OF SCHOOLS OFFERING GRADUATE TRAINING PROGRAMS IN REHABILITATION COUNSELING AND NUMBER OF GRADUATES: 1967

Location	School [1]	Ownership	Students	Graduates [2]
	Total, 65 institutions		1,684	638
Ala	University of Alabama, University	Public	44	21
	Auburn University, Auburn	do	5	—
Ariz	University of Arizona, Tucson	do	44	20
Ark	University of Arkansas, Fayetteville	do	—	—
Calif	California State College at Los Angeles	do	72	25
	Sacramento State College, Sacramento	do	—	—
	San Diego State College, San Diego	do	8	—
	San Francisco State College, San Francisco	do	57	21
	University of Southern California, Los Angeles	Private	—	—
Colo	Colorado State College, Greeley	Public	61	16
Conn	University of Connecticut, Storrs	do	3	—
D.C	The George Washington University, Washington	Private	—	—
Fla	Florida State University, Tallahassee	Public	22	—
	University of Florida, Gainesville	do	58	24
Ga	Georgia State College, Atlanta	do	—	—
	University of Georgia, Athens	do	63	16
Hawaii	University of Hawaii, Honolulu	do	9	3
Ill	DePaul University, Chicago	Private	22	10
	Illinois Institute of Technology, Chicago	do	5	—
	University of Illinois, Urbana	Public	28	10
	Southern Illinois University, Carbondale	do	57	16
Ind	Indiana University, Bloomington	do	27	4
Iowa	State University of Iowa, Iowa City	do	31	12
Kans	Kansas State Teachers College, Emporia	do	10	—
Ky	University of Kentucky, Lexington	do	24	6
La	University of Southwestern Louisiana, Lafayette	do	—	—
Md	University of Maryland, College Park	do	26	13
Mass	Boston University, Boston	Private	28	12
	Springfield College, Springfield	do	20	13
Mich	Michigan State University, East Lansing	Public	70	26
	Wayne State University, Detroit	do	23	17
Minn	Mankato State College, Mankato	do	6	—
	University of Minnesota, Minneapolis	do	38	20
Miss	Mississippi State University, State College	do	10	—

See footnotes at end of table.

Table 142. LOCATION AND OWNERSHIP OF SCHOOLS OFFERING GRADUATE TRAINING PROGRAMS IN REHABILITATION COUNSELING AND NUMBER OF GRADUATES: 1967—Con.

Location	School [1]	Ownership	Students	Graduates [2]
Mo.	University of Missouri, Columbia	Public	29	12
Nebr.	University of Nebraska, Lincoln	do	10	—
N.J.	Seton Hall University, South Orange	Private	27	8
N.Y.	State University of New York at Albany, Albany	Public	—	—
	State University of New York at Buffalo, Buffalo	do	54	18
	Columbia University, New York	Private	50	26
	Hofstra University, Hempstead	do	—	—
	Hunter College of the City University of New York, New York.	Public	19	9
	New York University, New York	Private	51	21
	Syracuse University, Syracuse	do	46	14
N.C.	East Carolina University, Greenville	Public	—	—
	University of North Carolina, Chapel Hill	do	—	—
Ohio	Bowling Green State University, Bowling Green	do	5	—
	University of Cincinnati, Cincinnati	do	6	—
	Kent State University, Kent	do	44	19
Okla.	Oklahoma State University, Stillwater	do	20	9
Oreg.	University of Oregon, Eugene	do	48	14
Pa.	The Pennsylvania State University, University Park	Private	61	24
	University of Pittsburgh, Pittsburgh	do	44	27
	University of Scranton, Scranton	do	29	16
S.C.	University of South Carolina, Columbia	Public	7	—
Tenn.	University of Tennessee, Knoxville	do	10	—
Tex.	Texas Technological College, Lubbock	do	41	16
	University of Texas, Austin	do	15	11
Utah	University of Utah, Salt Lake City	do	20	9
Va.	Richmond Professional Institute, Richmond	do	48	22
Wash.	University of Washington, Seattle	do	15	—
W. Va.	West Virginia University, Morgantown	do	37	20
Wis.	The University of Wisconsin, Madison	do	30	13
	The University of Wisconsin, Milwaukee	do	16	8
P.R.	University of Puerto Rico, Rio Piedras	do	31	17

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[1] Institutions receiving Rehabilitation Services Administration training grants in the field of rehabilitation counseling.

[2] Master's degree in rehabilitation counseling or certificate to those with a master's degree in a related field.

Source: U.S. Department of Health, Education, and Welfare; Rehabilitation Services Administration, Division of Training.

CHAPTER 35

Miscellaneous Health Services

Hospitals in increasing numbers are employing persons who are variously called technicians, assistants, and aides. These individuals are usually high school graduates who may also have had some college courses. They receive inservice training while working under the continuous supervision of physicians and/or registered nurses.

The inhalation therapy technician, electrocardiograph technician, electroencephalograph technician, and a variety of other assistants for patient care are discussed in this chapter. The hospital-based therapists in specialized rehabilitation services are discussed in chapter 30. For other emerging occupations there is insufficient occupational identification or data to permit assessment of their supply.

Inhalation Therapy Technician

The *inhalation therapy technician*, often called a therapist, uses skills and equipment to attempt to restore the respiratory system to its normal function. In small hospitals this service may be provided by the regular nursing staff. In larger institutions, however, the inhalation therapy department may consist of from one to 20 therapists working full time under medical supervision in administering treatments, maintaining an adequate supply of oxygen and good equipment, and keeping accurate records.

The majority of inhalation therapy departments work under the direct supervision of the anesthesiology department or the pulmonary department of hospitals. The PHS-AHA survey of manpower resources in hospitals referred to in the introduction indicates that almost 5,600 inhalation therapists were employed in hospitals as of April 1966. Others work for firms that provide emergency oxygen service, for clinics, or for municipal organizations.

The number of persons employed as inhalation therapists in 1967 was probably in excess of 7,000. The American Association for Inhalation Therapy reports 4,200 members. A registry of those persons who have qualified through oral and written examinations is maintained by the American Registry of Inhalation Therapists; 515 persons were registered as of December 1, 1967.

As of March 1968, 39 schools offered approved programs for inhalation therapy technicians, in accordance with minimal standards initiated in 1963. Courses of study that are no less than 9 months in length include academic instruction and supervised clinical experience. The courses are open to high school graduates and graduates of a school of nursing. While the majority of the schools are hospital based, colleges are becoming increasingly interested in the education of inhalation therapy technicians (table 143 and 144).

Electrocardiograph Technician

Electrocardiography involves recording the changes of electrical potential occurring during the heartbeat by use of an electrocardiograph (ECG or EKG) machine. It is used in diagnosing abnormalities in heart action or recording the progress of patients with heart conditions, as well as providing followup for those patients receiving cardiotoxic medications. The electrocardiograph technician operates the machine and gives the recorded tracings to physicians who are qualified in cardiology for analysis and interpretation.

More than 6,000 *electrocardiograph technicians* are employed in this country, with the great majority in the cardiology service of hospitals. They perform in a laboratory or at the patient's bedside if the patient cannot be moved. The technician attaches electrodes to various parts of the patient's body and moves the chest electrodes to successive positions across the patient's chest, obtaining several different tracings of the heart action by the ECG machine.

No specialized formal education is required for these auxiliaries. However, high school graduation with courses in the physical sciences and some college work are desirable. On-the-job training in a hospital usually lasts from 3 to 6 months, under the supervision of an experienced technician or cardiologist.

Electroencephalograph Technician

Electroencephalography involves the detecting, measuring, and recording of brain waves by the use of an electroencephalograph (EEG) machine. It is of great importance in the evaluation and treatment of patients with various types of brain disease or trauma. The *electroencephalograph technician* is trained to use the machine to record brain waves. These tracings are interpreted by a physician, usually a neurologist, with training in encephalography.

An estimated 2,000 or more electroencephalograph technicians were employed full or part time in 1967. They usually work in the neurology service of a large hospital. However, some give tests in a neurologist's office.

The EEG technician may take on-the-job training in a hospital EEG department, generally serving an apprenticeship lasting 3 to 6 months. This practical experience may be supplemented by lectures on neuroanatomy, neurophysiology, and electronics. A minimum background of high school science courses and an aptitude for working with complicated electrical equipment are needed. Formal training programs are being developed in several junior colleges and hospitals (table 145). For some of these programs a minimum of 2 years of college preparation is required prior to admission.

National professional societies include the American Society of Electroencephalographic Technicians (ASET) which was organized in 1960 and now reports 550 active and associate members. This count includes many but not all of the members from the regional societies.

An American Board of Registration of Electroencephalographic Technicians (ABRET) was established in 1964. To date, 57 persons have been registered upon satisfactory completion of the written and oral examinations. A certificate of registration entitles the technician to the use of the designation R. EEG T.

Other Assistants for Patient Care

Assistants or aides are identified according to the hospital service in which they work. For example, *surgical aides*, also called *surgical technical aides* or *operating room assistants*, work under the continuous supervision of the operating room nurses or surgeons. They assist in the care of patients in the operating room and/or delivery room and in the care, preparation, and maintenance of sterile and nonsterile supplies and equipment. Almost 19,000 surgical technical aides are presently employed in hospitals.

There are also obstetrical aides, orthopedic aides, pediatric aides, and others involved in patient care.

There are no formal educational requirements for persons who receive inservice training in hospitals. In recent years a few programs for high school graduates have been developed in vocational or trade schools operated under public school systems in cooperation with hospitals that have suitable facilities.

Table 143. APPROVED SCHOOLS OF INHALATION THERAPY, ENROLLMENTS AND GRADUATES: 1963–64 THROUGH 1967–68

Academic year	Schools	Students	Graduates
1967–68	39	292	----------
1966–67	30	178	150
1965–66	21	102	102
1964–65	11	48	48
1963–64	7	49	----------

Sources: Council on Medical Education: Education Number of the *J.A.M.A.* Chicago. American Medical Association. Annual issues for 1963–64 through 1966–67 data.
American Association for Inhalation Therapy for 1967–68 data.

Table 144. LOCATION AND OWNERSHIP OF APPROVED SCHOOLS OFFERING INHALATION THERAPY PROGRAMS AND NUMBERS OF STUDENTS: 1968

Location	School	Ownership	Students [1]
	Total, 39 schools		292
California	Foothill College, Los Altos Hills	Public	19
	UCLA Center of the Health Sciences, Los Angeles	do	18
	Mt. San Antonio College, Walnut	do	27
Colorado	General Rose Memorial Hospital, Denver	do	10
Connecticut	School of Inhalation Therapy, New Britain	Private	8
	Hospital of St. Raphael, New Haven	do	6
	Yale-New Haven Hospital, New Haven	Public	14
	Lawrence and Memorial Hospitals, New London	Private	4
Georgia	Crawford W. Long Memorial Hospital, Atlanta	Public	7
Illinois	Cook County Hospital, Chicago	do	----------
	Edgewater School of Inhalation Therapy, Chicago	Private	12
	University of Chicago Hospital and Clinics, Chicago	Public	8
	St. Mary's Hospital, Decatur	Private	----------
	Gottlieb Memorial Hospital, Melrose Park	do	----------
	Lutheran Hospital, Moline	do	4
	Memorial Hospital, Springfield	Public	5
	St. John's Hospital, Springfield	Private	4
Indiana	Indiana University School of Inhalation Therapy, Indianapolis	Public	5
	St. Mary Mercy Hospital, Gary	Private	----------
Kansas	St. Francis Hospital, Wichita	do	6
	Wesley Medical Center, Wichita	do	6
Kentucky	University of Kentucky Medical Center, Lexington	Public	5
Massachusetts	New England Medical Center Hospitals, Boston	Private	3
Michigan	University Hospital and Washtenaw Community College, Ann Arbor.	Public	23
Missouri	University of Missouri, Columbia	do	2
	Menorah Medical Center, Kansas City	Private	15
	St. Mary's Hospital, St. Louis	do	4
New York	Fox Memorial Hospital, Oneonta	do	4
North Carolina	Duke University Medical Center, Durham	do	8
	North Carolina Baptist Hospital, Winston-Salem	do	----------
Pennsylvania	St. Joseph Hospital, Lancaster	do	8
	Hospital of the University of Pennsylvania, Philadelphia	do	18
	University of Pittsburgh Health Center Hospital, Pittsburgh	Public	11
	Robert Packer Hospital, Sayre	Private	----------
Rhode Island	Rhode Island Hospital, Providence	Public	6
South Carolina	Medical College Hospital, Charleston	do	5
South Dakota	Memorial Hospital School, Watertown	do	4
Tennessee	Baroness Erlanger Hospital, Chattanooga	do	5
Wisconsin	Mt. Sinai Hospital, Milwaukee	Private	8

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[1] As of March 1968.

Source: American Association for Inhalation Therapy.

Table 145. LOCATION AND OWNERSHIP OF INSTITUTIONS OFFERING TRAINING PROGRAMS IN ELECTROENCEPHALOGRAPHY: SPRING 1968

Location	Institution [1]	Ownership
Ga	Emory University, Atlanta	Private.
Iowa	University of Iowa, Iowa City	Public.
La	Louisiana State University Medical School, New Orleans	Do.
Md	Johns Hopkins Hospital, Baltimore	Private.
Mass	Massachusetts General Hospital, Boston	Do.
	Children's Hospital Medical Center, Boston	Do.
Minn	Mayo Clinic, Rochester	Do.
N.C	Duke University, Durham	Do.
Va	Medical College of Virginia, Richmond	Do.
Wash	University of Washington, Seattle	Public.
Wis	University of Wisconsin, Madison	Do.

[1] This list of 11 institutions is known to be incomplete. Data are not available on student enrollment.

Source: American Society of Electroencephalographic Technicians.

PART II

Inpatient Health Facilities

INTRODUCTION

In 1967, there were approximately 30,600 inpatient health facilities in the United States. Of these, 19,100, or 62 percent, were in the nursing care and related home category; hospitals accounted for an additional 27 percent; and sheltered care facilities for the remaining 11 percent. This represents an increase of 3,400 inpatient health facilities or 13 percent since 1963. During this period, however, the population increased by only 5 percent. The increase in facilities was mainly due to the large increase in nursing and personal care homes, since only slight increases, if any, were indicated for other types of health facilities (tables 146, 147, and 148).

There were approximately 2.7 million beds in inpatient health facilities in 1967. This included 901,738 beds in short-stay hospitals, 729,363 beds in long-stay hospitals, 846,554 beds in nursing care and related homes, and 221,221 beds in other inpatient health facilities. Seventy-six percent of all health facilities in 1967 had a capacity of less than 75 beds. Seventy-six percent of psychiatric facilities, however, had a capacity of 75 beds or more, with 41 percent of these institutions having more than 1,000 beds (tables 150, 151).

In the United States there was an increase in the bed-to-population ratio for all facilities, from 12 beds per 1,000 persons in the U.S. population in 1963, to 14 beds per 1,000 persons in 1967. This occurred despite the fact that the bed-to-population ratio for tuberculosis and psychiatric hospitals combined decreased from 3.5 to 2.9 beds per 1,000 persons during the same period. The latter decrease in the bed-to-population ratio resulted from the elimination or conversion to other uses of psychiatric and tuberculosis beds. For tuberculosis hospitals this represents a decrease in the number of admissions, and for psychiatric hospitals, a reduction in the length of stay and the transfer of older patients to other long-stay facilities.

Slightly more than half of all health facilities were privately owned and managed. Churches and other nonprofit organizations owned some 29 percent. The remaining 16 percent were owned by governments, Federal, State, and local. The majority of short-stay hospitals (54 percent) and other inpatient facilities (59 percent) were owned by churches and other nonprofit organizations. Long-stay hospitals, on the other hand, were largely (57 percent) under Federal, State, and local government ownership. Nursing care and related homes were almost all (77 percent) proprietary (table 149).

There were 2.4 million persons residing in inpatient health facilities in 1967. About 676,700 were patients in short-stay hospitals; 664,210, in long-stay hospitals; 756,239, in nursing care and related homes; and 348,254 were residents in other inpatient health facilities (table 152).

Approximately 2.6 million persons were employed full time (35 hours or more during the week) in 1967 in inpatient health facilities with almost 62 percent employed in short-stay hospitals, 17 percent in long-stay hospitals, 15 percent in nursing care and related homes, and 6 percent in other types of inpatient facilities. The ratio of employees to patients varied greatly by type of facility. There were 2.3 full-time employees for every patient in short-stay hospitals compared with 0.4 employees in other inpatient health facilities and 1.0 for all inpatient facilities (table 152).

These data on the numbers, bed size, staffing, and utilization of inpatient facilities were obtained from the 1967 Master Facility Inventory.

The Master Facility Inventory (MFI)

The Division of Health Resources Statistics of the National Center for Health Statistics conducts a national statistical program of data collection on all inpatient health facilities in the United States including short-stay hospitals, long-stay hospitals, nursing homes, and other health and correctional facilities. This data system (the Master Facility Inventory or MFI) consists of (a) the Master Facility List (MFL) which is a computer tape containing the names and addresses of all known inpatient health facilities in the United States, (b) the Master Facility Census (MFC) which is a system of planned censuses of inpatient health facilities taken biannually or more frequently to determine the type of business, the number of employees, and the number of residents or patients in these facilities at the time of the census, and (c) the Agency Reporting System (ARS) which is a program for determining on an annual or more frequent basis the names and addresses of all newly established inpatient facilities. The ARS consists of national voluntary organizations and Federal and State agencies, including health, welfare, and voluntary religious organizations; publishers of commercial directories; State agencies which administer, regulate, license, certify, approve, list, or are otherwise concerned with medical and resident care facilities; and Federal agencies that administer inpatient facilities. The ARS provides accessions to the system which are matched with the MFL and any nonmatches are then added to the MFL. Listed facilities which are nonexistent due to termination of business or for other reasons are eliminated from the MFL by biennial or more frequent surveys. The 1967 MFL was derived from a list of facilities in the 1963 MFC plus lists supplied by the ARS.

Presently, the NCHS has computer tapes available of lists of inpatient health facilities in the United States, including hospitals, nursing care and related homes and other inpatient health facilities. Further details about this program may be obtained from the Chief, Health Facilities Statistics Branch, National Center for Health Statistics, Washington, D.C. 20201.

MFI CLASSIFICATION OF HEALTH FACILITIES

In the MFI, the following definitions of facilities have been used.

Hospital

A hospital is defined as a facility which is licensed by the State as a hospital, or operated as a hospital by a Federal or State agency and therefore not subject to State or local licensing laws.

Facilities Providing Nursing Care

Places providing some form of nursing, personal, or domiciliary care were classified according to the primary or predominant service provided as follows:

1. A *nursing care home* is defined as one in which 50 percent or more of the residents receive one or more nursing services and the facility has at least one registered nurse (RN) or licensed practical nurse (LPN) employed 35 or more hours per week. Nursing services include nasal feeding, catheterization, irrigation, oxygen therapy, full bed bath, enema, hypodermic injection, intravenous injection, temperature-pulse-respiration, blood pressure, application of dressing or bandage, or bowel and bladder retraining.
2. A *personal care with nursing home* is defined as one in which either (a) some, but less than 50 percent, of the residents receive nursing care or (b) more than 50 percent of the residents receive nursing care, but no RN's or LPN's were employed full time on the staff.
3. A *personal care home* is defined as one in which the facility routinely provides three or more personal services, but no nursing service. Personal services include rub or massage service or assistance with bathing, dressing, correspondence or shopping, walking or getting about, or eating.
4. A *domiciliary care home* is defined as one in which the facility routinely provides less than three of the personal services specified in the definition above, and no nursing service. This type of facility provides a sheltered environment primarily to persons who are able to care for themselves.

If room and board are the only services provided by an establishment, it is excluded as a health facility.

Other Inpatient Health Facilities

An "other inpatient health facility" is defined as a facility which provides services such as training and sheltered care, rather than medical or nursing care. The similarity of functions performed by all facilities for the mentally retarded plus the problems of distinguishing among various types of treatment facilities led to grouping all facilities for the mentally retarded under the category "other inpatient health facility."

The facilities listed below constitute those classified by the MFI, as "other inpatient health facilities."

(1) Home for the blind and deaf.
(2) Home for unwed mothers.
(3) Orphanage.
(4) Home for dependent children.
(5) Home or school for the physically handicapped.
(6) Facility for the mentally retarded.
(7) Home for the emotionally disturbed.

Other Sources of Data

The American Hospital Association (AHA) annually publishes information on hospitals in the United States and outlying areas and lists hospitals and all health care facilities accredited by the Joint Commission on Accreditation of Hospitals (*47*). A variety of information is published concerning each individual hospital, including facilities and services available within the hospital, the type of ownership, financial data and other statistical data.

The National Institute of Mental Health conducts an annual survey of all inpatient and outpatient psychiatric facilities in the United States. The findings on staffing, numbers of facilities, admissions, terminations, and resident patients are published annually in a series of statistical reports (*48*, *49*, *50*). In addition, expenditure data by type of psychiatric facilities are planned for publication by the end of 1968.

In 1967, the Bureau of the Census conducted a survey of institutionalized adults for the Social Security Administration (SSA). This survey obtained information on patient charges, the type of care received, and on the social and economic characteristics of patients or residents in hospitals, rehabilitation and other training schools, and in other long-stay facilities.

The 1960 Census of Population provides summary statistics on the number of institutions by type and size. In addition, statistics were published on the characteristics of persons under care or custody in institutions in the United States. The statistics are based on a 25 percent sample of the population (*51*).

In early 1968 the National Center for Health Statistics conducted a nationwide survey of all resident facilities providing nursing and personal care services. This survey will provide information on admission policies, services, and staff of these facilities as well as the kinds of such facilities in the United States.

The Division of Hospital and Medical Facilities of the U.S. Public Health Service under provision of the Hill-Burton Hospital Survey and Construction Act publishes U.S. summary statistics annually on civilian health facilities showing both supply and requirements. These statistics are developed by the various State Agencies responsible for administering the program. "Each State Plan includes an inventory of all non-Federal inpatient and outpatient facilities exclusive of mental hospitals, institutions furnishing domiciliary care, and institutions not providing a community service" (*52*). Inpatient facilities are reported in the State Plans according to the following major categories of services provided: general, long-term care (chronic disease and skilled nursing home beds), and tuberculosis. Facilities for outpatient care include public health centers, diagnostic or treatment centers, and rehabilitation facilities (*52*). Excluded are such outpatient facilities as physicians offices, certain clinics, ambulance services, and pharmacies.

The Social Security Administration under the health insurance program for the aged publishes directories of providers of service (*53–56*). Names and addresses of these providers of service which are certified by the SSA, such as hospitals, extended care facilities, home health agencies, and independent laboratories are listed.

The Veterans' Administration (VA) medical program provides hospital, outpatient, nursing, and domiciliary care to eligible veterans. In connection with this program, the VA publishes annually information on their medical system (*57*).

License

In those instances where inpatient health facilities are regulated, there were more than 100 State agencies which licensed, approved, certified, supervised or otherwise regulated them. These regulatory responsibilities assume different forms in various States and differ in number by State.

Licensing is the most common form of regulation. A license to operate within a State, issued by a State agency, is a means of identifying hospitals, nursing care and related homes, and other inpatient health facilities. Licensing

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statistics secured from State licensure agencies over a period of time may be used to determine shifts in the patterns of growth for the various types of facilities licensed.

Health and welfare departments accounted for three-quarters of all agencies providing regulatory functions. In most States the health department regulates hospitals and nursing homes and the welfare department is responsible for the regulation of homes for dependent and neglected children and for homes for unwed mothers. A number of States, however, depart from the general pattern.

In order to summarize rules and regulations affecting medical and residential care facilities in the United States, the National Center for Health Statistics, is sponsoring a survey of those State agencies which license, certify, inspect, or otherwise regulate health facilities. These facilities will include all hospitals and those establishments which provide custodial, nursing, or personal care to residents or inmates. Preliminary findings are expected to be available in the spring of 1969.

Certification/Registration

Hospitals and extended care facilities participating in the health insurance program for the aged under the Social Security Act must be certified by designated State agencies to the effect that the facility is in general compliance with the conditions for participation. These requirements may take the form of round-the-clock skilled nursing care, medical supervision of each patient, clinical records on all patients, and transfer arrangements between facilities. Hospitals and other providers of service may be temporarily certified for participation under the program if they are found to be in substantial compliance with the conditions for participation, despite the fact that correctable deficiencies may be found with respect to one or more standards (*58*). Plans and actions for correcting these deficiencies must be undertaken within a stipulated time period.

Under the law, only those hospitals which have not been accredited by the Joint Commission on Accreditation Hospitals (JCAH) or the American Osteopathic Association (AOA) but are participating in the Medicare program must be resurveyed periodically. Only hospitals in an accredited status are excluded from the resurvey requirements. However, all hospitals regardless of accreditation, have to be surveyed for the utilization review requirements, and in addition psychiatric and tuberculosis hospitals have other special requirements.

The American Hospital Association (AHA) maintains a system of registration in order to identify health care institutions in the United States. The primary aim of the Association's program of accepting hospitals for registration is to maintain a roster of high quality hospitals in the United States. A hospital which has at least six beds for the care of patients and which meets certain other requirements as to its construction, medical staff, and services is eligible for registration under this program. Membership in the American Hospital Association is not a prerequisite for registration. A listing of these registered hospitals is published annually in the *Guide Issue* of the Journal of the American Hospital Association. The list is coded to indicate AHA members.

Accreditation

Voluntary accreditation programs by establishing standards for the operation of hospitals and other health care facilities and services have been an effective force in promoting and upgrading health care in this country. Participation in these programs has been voluntary on the part of the facilities involved. There are two accreditation boards that were organized for the purpose of accrediting health care facilities—the Joint Commission on Accreditation of Hospitals and the American Osteopathic Association (AOA).

The Joint Commission on Accreditation of Hospitals was formed 17 years ago by the cooperative efforts of the American College of Surgeons (which had performed accreditation surveys of hospitals for the preceding 35 years), the American College of Physicians, the American Hospital Association, the American Medical Association and the Canadian Medical Association. The Canadian Medical Association withdrew in 1959 in order to set up its own Canadian Council on Accreditation of Hospitals fashioned after the JCAH.

In 1966, the JCAH undertook the additional responsibility for the accreditation of extended, nursing, and resident care facilities. "Two additional groups, the American Association of

Homes for the Aging and the American Nursing Home Association were added as participating organizations with representation on the Board of Commissioners" (*59*). Registration with the American Hospital Association is a prerequisite for an accreditation survey by the JCAH.

Another program of the JCAH is to carry out the administrative and field program of the Commission on Accreditation of Rehabilitation Facilities (CARF). For nearly 10 years the Association of Rehabilitation Centers and the National Association of Sheltered Workshops and Homebound Programs have independently been working together to develop standards for quality, each for its own category of institution. In 1966 the two joined efforts to create the Commission on Accreditation of Rehabilitation Facilities.

The American Osteopathic Association is the accrediting body for osteopathic hospitals and osteopathic extended health care facilities. A listing of all osteopathic institutions accredited by the AOA appears annually in the Registry of Accredited Osteopathic Institutions (*60*).

Association Membership

Health facilities may belong to a variety of State, regional, or national professional organizations. These organizations range from general to specialized associations and may be large or small in number.

The American Hospital Association membership includes over 6,600 hospitals and other patient care institutions in the United States. The Association offers several types of membership depending upon the types of organizations involved. In order to be a member, a facility must be registered by the Association.

The American Nursing Home Association represents more than 7,000 nursing and convalescent homes which have an aggregate of more than 350,000 nursing home beds. Several types of group or individual memberships are offered by the Association depending upon the type of personnel or organization applying.

The American Association of Homes for the Aging is the national membership organization of nonprofit, voluntary, and governmental homes for the aging across the country. Approximately 900 institutions are members of the Association. In addition, the Association has other types of memberships depending upon the type of organization.

The American Osteopathic Hospital Association is the national organization which represents osteopathic hospitals in this country. Almost three-quarters of the approximately 300 osteopathic hospitals belong to the Association.

In addition, there are a number of smaller organizations to which health facilities belong.

Reliability of Data

Estimates of the completeness of coverage for the 1967 MFC are not available, but there is supporting evidence to indicate that coverage was high and represented a considerable improvement over the 1963 MFC, since the 1967 MFC included the earlier MFC as one of its sources. Comparison of the 1963 MFC with surveys conducted by the Bureau of the Census for NCHS, indicated that coverage of facilities for the 1963 MFC was about 90 percent complete. The most complete coverage was for hospitals. For nursing and personal-care-type homes coverage was about 90 percent complete, and for other types of institutions the coverage was estimated to be about 80 percent complete.

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(*59*) Joint Commission on Accreditation of Hospitals: *Standards for Accreditation of Extended Care Facilities, Nursing Care Facilities and Resident Care Facilities.* Chicago, January 1968.

(*60*) American Osteopathic Association: *Registry of Accredited Osteopathic Institutions, 1967–68.* Chicago, 1967.

Table 146. INPATIENT HEALTH FACILITIES AND BEDS BY TYPE OF FACILITY: 1963 AND 1967

Type of facility	Facilities		Beds			
			Number		Number per[1] 1,000 population	
	1963	1967	1963	1967	1963	1967
All facilities	27, 171	30, 586	2, 317, 425	2, 698, 876	12. 3	13. 6
Short-stay hospitals	6, 953	6, 839	788, 758	901, 738	4. 2	4. 6
General	6, 586	6, 508	765, 230	873, 311	4. 1	4. 4
Specialty	367	331	23, 528	28, 427	0. 1	0. 1
Long-stay hospitals	1, 230	1, 308	761, 194	729, 363	4. 0	3. 7
General	124	177	46, 646	85, 418	0. 2	0. 4
Psychiatric	471	473	602, 999	532, 158	3. 2	2. 7
Geriatric and chronic	182	307	37, 413	59, 109	0. 2	0. 3
Tuberculosis	254	166	49, 533	32, 895	0. 3	0. 2
Other	199	185	24, 603	19, 783	0. 1	0. 1
Nursing care and related homes	16, 701	19, 141	568, 560	846, 554	3. 0	4. 3
Nursing care	8, 128	10, 636	319, 224	584, 052	1. 7	3. 0
Personal care with nursing care	4, 958	3, 853	188, 306	191, 096	1. 0	1. 0
Personal care without nursing care	2, 927	4, 396	48, 962	66, 787	0. 3	0. 3
Domiciliary care	688	256	12, 068	4, 619	0. 1	0. 0
Other inpatient health facilities	2, 287	3, 298	198, 913	221, 221	1. 1	1. 1
Mental retardation	--------	1, 486	------------	212, 069	--------	1. 1
Other	--------	1, 812	------------	9, 152	--------	0. 0

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[1] U.S. Bureau of the Census: Population estimates. *Current Population Reports.* Series P-25, No. 380. Nov. 1967.

Table 147. INPATIENT HEALTH FACILITIES BY TYPE AND STATE: 1967

Location	Total facilities	Hospitals		Nursing care and related homes	Other facilities
		Short-stay	Long-stay		
United States	30, 586	6, 839	1, 308	19, 141	3, 298
Alabama	333	138	14	152	29
Alaska	56	25	4	4	23
Arizona	230	79	9	78	64
Arkansas	326	111	13	177	25
California	4, 312	586	164	2, 973	589
Colorado	315	93	16	164	42
Connecticut	469	40	28	366	35
Delaware	61	8	7	33	13
District of Columbia	126	15	7	85	19
Florida	615	206	17	327	65
Georgia	450	181	12	198	59
Hawaii	147	21	11	88	27
Idaho	115	48	4	56	7
Illinois	1, 398	267	61	914	156
Indiana	674	119	25	471	59
Iowa	955	141	16	731	67
Kansas	686	157	14	473	42
Kentucky	496	128	20	294	54
Louisiana	414	156	14	188	56
Maine	400	63	11	293	33
Maryland	318	56	32	198	32
Massachusetts	1, 225	151	69	952	53
Michigan	941	252	80	517	92
Minnesota	752	186	23	485	58
Mississippi	274	134	10	107	23
Missouri	686	165	21	436	64
Montana	169	71	2	82	14
Nebraska	440	117	14	279	30
Nevada	54	23	2	22	7
New Hampshire	202	34	12	137	19
New Jersey	729	110	38	507	74
New Mexico	186	64	4	58	60
New York	1, 763	367	94	1, 081	221
North Carolina	917	157	24	666	70
North Dakota	173	63	5	92	13
Ohio	1, 584	221	63	1, 126	174
Oklahoma	681	168	11	445	57
Oregon	402	88	17	271	26
Pennsylvania	1, 354	271	85	789	209
Rhode Island	206	19	6	170	11
South Carolina	229	95	12	93	29
South Dakota	230	71	5	125	29
Tennessee	475	172	25	219	59
Texas	1, 697	624	60	866	147
Utah	212	43	7	130	32
Vermont	163	25	4	121	13
Virginia	469	121	23	269	56
Washington	418	99	10	262	47
West Virginia	192	89	11	64	28
Wisconsin	794	169	68	477	80
Wyoming	73	32	4	30	7

Table 148. PERCENT DISTRIBUTION OF INPATIENT HEALTH FACILITIES BY TYPE AND STATE: 1967

Location	Number of facilities	Total	Hospitals		Nursing care related homes	Other facilities
			Short-stay	Long-stay		
United States	30,586	100.0	22.4	4.3	62.6	10.8
Alabama	333	100.0	41.4	4.2	45.6	8.7
Alaska	56	100.0	44.6	7.1	7.1	41.1
Arizona	230	100.0	34.3	3.9	33.9	27.8
Arkansas	326	100.0	34.0	4.0	54.3	7.7
California	4,312	100.0	13.6	3.8	68.9	13.7
Colorado	315	100.0	29.5	5.1	52.1	13.3
Connecticut	469	100.0	8.5	6.0	78.0	7.5
Delaware	61	100.0	13.1	11.5	54.1	21.3
District of Columbia	126	100.0	11.9	5.6	67.5	15.1
Florida	615	100.0	33.5	2.8	53.2	10.6
Georgia	450	100.0	40.2	2.7	44.0	13.1
Hawaii	147	100.0	14.3	7.4	60.0	18.4
Idaho	115	100.0	41.7	3.5	48.7	6.1
Illinois	1,398	100.0	19.1	4.4	65.4	11.2
Indiana	674	100.0	17.7	3.7	69.9	8.8
Iowa	955	100.0	14.8	1.7	76.5	7.0
Kansas	686	100.0	22.9	2.0	69.0	6.1
Kentucky	496	100.0	25.8	4.0	59.3	10.9
Louisiana	414	100.0	37.7	3.4	45.4	13.5
Maine	400	100.0	15.7	2.8	73.3	8.3
Maryland	318	100.0	17.6	10.1	62.3	10.1
Massachusetts	1,225	100.0	12.3	5.6	77.7	4.3
Michigan	941	100.0	26.8	8.5	54.9	9.8
Minnesota	752	100.0	24.7	3.1	64.5	7.7
Mississippi	274	100.0	48.9	3.6	39.1	8.4
Missouri	686	100.0	24.1	3.1	63.6	9.3
Montana	169	100.0	42.0	1.2	48.5	8.3
Nebraska	440	100.0	26.6	3.2	63.4	6.8
Nevada	54	100.0	42.6	3.7	40.7	13.0
New Hampshire	202	100.0	16.8	5.9	67.8	9.4
New Jersey	729	100.0	15.1	5.2	69.5	10.2
New Mexico	186	100.0	34.4	2.2	31.2	32.3
New York	1,763	100.0	20.8	5.3	61.3	12.5
North Carolina	917	100.0	17.1	2.6	72.6	7.6
North Dakota	173	100.0	36.4	2.9	53.2	7.5
Ohio	1,584	100.0	14.0	4.0	71.1	11.0
Oklahoma	681	100.0	24.7	1.6	65.3	8.4
Oregon	402	100.0	21.9	4.2	67.4	6.5
Pennsylvania	1,354	100.0	20.0	6.3	58.3	15.4
Rhode Island	206	100.0	9.2	2.9	82.5	5.3
South Carolina	229	100.0	41.5	5.2	40.6	12.7
South Dakota	230	100.0	30.9	2.2	54.3	12.6
Tennessee	475	100.0	36.2	5.3	46.1	12.4
Texas	1,697	100.0	36.8	3.5	51.0	8.7
Utah	212	100.0	20.3	3.3	61.3	15.1
Vermont	163	100.0	15.3	2.5	74.2	8.0
Virginia	469	100.0	25.8	4.9	57.4	11.9
Washington	418	100.0	23.7	2.4	62.7	11.2
West Virginia	192	100.0	46.4	5.7	33.3	14.6
Wisconsin	794	100.0	21.3	8.6	60.1	10.1
Wyoming	73	100.0	43.8	5.5	41.1	9.6

Table 149. OWNERSHIP OF INPATIENT HEALTH FACILITIES BY TYPE: 1967

Type of facility	Total	Government		Proprietary	Nonprofit	
		Federal	State-local		Church	Other
All facilities	30, 586	560	4, 360	16, 840	2, 672	6, 154
Short-stay hospitals	6, 839	321	1, 642	1, 188	902	2, 786
General	6, 508	319	1, 599	1, 043	876	2, 671
Specialty	331	2	43	145	26	115
Long-stay hospitals	1, 308	116	631	214	74	273
General	177	70	50	14	8	35
Psychiatric	473	40	275	71	17	70
Geriatric and chronic	307	—	122	109	24	52
Tuberculosis	166	4	150	3	1	8
Other	185	2	34	17	24	108
Nursing care and related homes	19, 141	25	1, 437	14, 831	999	1, 849
Nursing care	10, 636	6	527	8, 878	414	811
Personal care with nursing care	3, 853	7	304	2, 409	450	683
Personal care without nursing care	4, 396	12	570	3, 356	126	332
Domiciliary care	256	—	36	188	9	23
Other inpatient health facilities	3, 298	98	650	607	697	1, 246
Mental retardation	1, 486	15	316	535	179	441
Other	1, 812	83	334	72	518	805

Table 150. INPATIENT HEALTH FACILITIES BY TYPE AND BED SIZE: 1967

Type of facility	Total facilities	Under 25 beds	25–49 beds	50–74 beds	75–99 beds	100–199 beds	200–299 beds	300–499 beds	500–999 beds	1,000 beds or more
All facilities	30, 586	12, 228	6, 930	3, 936	2, 092	2, 992	964	739	339	366
Short-stay hospitals	6, 839	826	1, 683	1, 007	651	1, 285	631	527	188	41
General	6, 508	717	1, 615	962	618	1, 236	615	521	187	37
Specialty	331	109	68	45	33	49	16	6	1	4
Long-stay hospitals	1, 308	86	183	162	126	214	101	96	104	236
General	177	7	18	14	10	24	18	28	26	32
Psychiatric	473	37	45	31	23	51	26	24	44	192
Geriatric and chronic	307	21	52	43	49	72	28	17	17	8
Tuberculosis	166	2	18	24	24	40	22	20	14	2
Other	185	19	50	50	20	27	7	7	3	2
Nursing care and related homes	19, 141	8, 522	4, 868	2, 697	1, 281	1, 443	216	91	16	7
Nursing care	10, 636	2, 673	3, 490	2, 146	1, 060	1, 073	128	51	10	5
Personal care with nursing care	3, 853	1, 876	877	438	199	336	82	37	6	2
Personal care without nursing care	4, 396	3, 754	476	108	20	33	5	—	—	—
Domiciliary care	256	219	25	5	2	1	1	3	—	—
Other inpatient health facilities	3, 298	2, 794	196	70	34	50	16	25	31	82
Mental retardation	1, 486	1, 077	132	52	31	46	13	22	31	82
Other	1, 812	1, 717	64	18	3	4	3	3	—	—

Table 151. PERCENT DISTRIBUTION OF INPATIENT HEALTH FACILITIES BY TYPE AND BED SIZE: 1967

Type of facility	Total facilities	Under 25 beds	25–49 beds	50–74 beds	75–99 beds	100–199 beds	200–299 beds	300–499 beds	500–999 beds	1,000 beds or more
All facilities	100. 0	40. 0	22. 7	12. 9	6. 8	9. 8	3. 2	2. 4	1. 1	1. 2
Short-stay hospitals	100. 0	12. 1	24. 6	14. 7	9. 5	18. 8	9. 2	7. 7	2. 7	0. 6
General	100. 0	11. 0	24. 8	14. 8	9. 5	19. 0	9. 4	8. 0	2. 9	0. 6
Specialty	100. 0	32. 9	20. 5	13. 6	10. 0	14. 8	4. 8	1. 8	0. 3	1. 2
Long-stay hospitals	100. 0	6. 6	14. 0	12. 4	9. 6	16. 4	7. 7	7. 3	8. 0	18. 0
General	100. 0	4. 0	10. 2	7. 9	5. 6	13. 6	10. 2	15. 8	14. 7	18. 1
Psychiatric	100. 0	7. 8	9. 5	6. 6	4. 9	10. 8	5. 5	5. 1	9. 3	40. 6
Geriatric and chronic	100. 0	6. 8	16. 9	14. 0	16. 0	23. 5	9. 1	5. 5	5. 5	2. 6
Tuberculosis	100. 0	1. 2	10. 8	14. 5	14. 5	24. 1	13. 3	12. 0	8. 4	1. 2
Other	100. 0	10. 3	27. 0	27. 0	10. 8	14. 6	3. 8	3. 8	1. 6	1. 1
Nursing care and related homes	100. 0	44. 5	25. 4	14. 1	6. 7	7. 5	1. 1	0. 5	0. 1	0. 0
Nursing care	100. 0	25. 1	32. 8	20. 2	10. 0	10. 1	1. 2	0. 5	0. 1	0. 0
Personal care with nursing care	100. 0	48. 6	22. 8	11. 4	5. 2	8. 7	2. 1	1. 0	0. 2	0. 1
Personal care without nursing care	100. 0	85. 4	10. 8	2. 5	0. 5	0. 8	0. 1	—	—	—
Domiciliary care	100. 0	85. 5	9. 8	2. 0	0. 8	0. 4	0. 4	1. 2	—	—
Other inpatient health facilities	100. 0	84. 7	6. 0	2. 1	1. 0	1. 5	0. 5	0. 8	0. 9	2. 5
Mental retardation	100. 0	72. 5	8. 9	3. 5	2. 1	3. 1	0. 9	1. 5	2. 1	5. 5
Other	100. 0	94. 8	3. 5	1. 0	0. 2	0. 2	0. 2	0. 2	—	—

Table 152. INPATIENT HEALTH FACILITIES, RESIDENTS, AND FULL-TIME EMPLOYEES BY TYPE: 1967

Type of facility	Facilities	Residents	Full-time employees
All facilities	30, 586	2, 445, 422	2, 561, 997
Short-stay hospitals	6, 839	676, 719	1, 583, 641
General	6, 508	655, 603	1, 545, 270
Specialty	331	21, 116	38, 371
Long-stay hospitals	1, 308	664, 210	431, 210
General	177	72, 803	90, 315
Psychiatric	473	499, 764	251, 885
Geriatric and chronic	307	51, 561	45, 477
Tuberculosis	166	24, 089	24, 572
Other	185	15, 993	18, 961
Nursing care and related homes	19, 141	756, 239	383, 158
Nursing care	10, 636	534, 721	301, 498
Personal care with nursing care	3, 853	161, 276	63, 800
Personal care without nursing care	4, 396	56, 649	16, 361
Domiciliary care	256	3, 593	1, 499
Other inpatient health facilities	3, 298	348, 254	163, 988
Mental retardation	1, 486	218, 871	113, 098
Other	1, 812	129, 383	50, 890

CHAPTER 36

Hospitals

The first hospitals in the United States were established over 200 years ago. "There is no record of hospitals in the early days of the American colonies. The first efforts for the care of the sick were incidental to shelter for the poor and unfortunate through almshouses. The first of these was founded in Philadelphia by William Penn in 1713, followed soon by others in New York City and Charleston, S.C. The famous Charity Hospital in New Orleans, dating from 1737, was originally both a hospital and an asylum for the indigent. The first bona fide hospital in the United States solely for the physically and mentally ill, without regard to economic status or race or creed, was established in 1751 and was known as the Pennsylvania Hospital. Other early hospitals grew out of a need to provide a place for clinical practice for medical schools, in New York, Massachusetts, and Connecticut. These early hospitals were chiefly of voluntary sponsorship, outside of public or church sponsorship." (*61*). Federal Government participation in health care was initiated with the establishment of the Public Health Service hospital program for merchant seamen in 1798. State government participation in health care, however, was mainly confined to the mental health field with construction of large State institutions between 1825 and 1850.

The first count of hospitals was compiled by the U.S. Bureau of Education in 1873; only 178 hospitals were listed (*62*). In 1909, the Bureau of the Census survey of hospitals showed 4,359 hospitals of all types, with a total of 421,000 beds. Subsequent censuses indicated that the number of hospitals increased to 5,047 in 1914, with 532,400 beds, and to 6,852 in 1928, with 893,000 beds. By 1938 the number of hospitals had decreased to 6,166 hospitals, but the number of beds increased to 1,161,380 beds (*63*). In 1963, the number again increased to almost 8,200 hospitals with 1.5 million beds, and in 1967, although the number of hospitals remained constant at 8,200 hospitals, the number of beds increased to 1.6 million beds.

Although each State requires that hospitals be licensed in order to operate, the requirements and standards for licensure vary considerably from State to State. State agencies—in most States, the health department—have the responsibility for the licensing of these facilities.

Unlike licensure, accreditation standards do not vary by State, and the accreditation program is purely voluntary on the part of the hospital. Hospital accreditation by the Joint Commission on Accreditation of Hospitals (JCAH) may be granted for 3 years or for 1 year, or it may be withheld, if the hospital does not meet specific standards. At the end of the accreditation period (either 3 years or 1 year) the hospital is automatically surveyed to reevaluate its accreditation status. A hospital that has been refused accreditation may apply for another survey to determine its accreditation status, usually after 6 months have elapsed from the initial survey (*64*). In 1967, 66 percent of all hospitals in the United States were accredited (*65*). The remaining 34 percent either failed to apply or were rejected for accreditation.

Short-Stay Hospitals

Hospitals which reported that their discharged patients had an average stay of 30 days or less during the year are considered as short-stay hospitals in the 1967 MFC. Almost all of the short-stay hospitals were general hospitals; that is, a facility which provides diagnostic and treatment services for patients who have a variety of medical conditions both surgical and nonsurgical. A few, about 5 percent, fell into the specialty class. This latter group consists largely of pediatric, maternity, and eye, ear, nose, and throat hospitals (table 153).

During 1967, there was approximately one short-stay hospital bed for every 219 persons in the U.S. population. In these hospitals there was a daily average of 677,000 patients, and there were more than 29 million admissions—or roughly 33 admissions per bed per year (table 154).

Of the Nation's 901,738 beds in short-stay hospitals, 71 percent were medical/surgical, 10 percent were obstetrical, 8 percent were pediatric, 4 percent were psychiatric, and 7 percent were other specialities (table 156).

In 1967, almost 2 million persons were employed either full or part time in short-stay hosptials. Eighty-one percent of these were employed full time. Nationally, there was an average of two full-time employees for each patient. Almost half of the States were above the national average (table 155).

Long-Stay Hospitals

Hospitals which reported that their discharged patients had an average stay of more than 30 days during the year were considered as long-stay hospitals in the 1967 MFC. The 1,300 long-stay hospitals in this country had about 729,400 beds and admitted 1,101,100 patients in 1967. There was approximately 1 bed in a long-stay hospital for every 271 persons in the U.S. population (tables 157 and 158).

Psychiatric beds comprised 66 percent of all long-stay hospital beds; medical surgical beds an additional 10 percent; and beds devoted to chronic disease, rehabilitation, and other services comprised the other 24 percent (table 160).

Almost a half million persons were employed in long-stay hospitals for an average of something less than one full-time employee per patient. Three States, Alaska, Kansas, and New Mexico had more than one full-time employee per patient (table 159).

Hospitals for the Mentally Retarded

Data on hospitals for the mentally retarded have been combined with data on homes or resident schools for the mentally retarded. (See ch. 38.)

REFERENCES

(*61*) Division of Hospital and Medical Facilities: *The Nation's Health Facilities, Ten Years of the Hill-Burton Hospital and Medical Facilities Program, 1946–56.* PHS Pub. No. 616. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1958.

(*62*) Commission on Hospital Care: *Hospital Care in the United States.* New York. The Commonwealth Fund, 1947.

(*63*) Bureau of the Census: *Historical Statistics of the United States, Colonial Times to 1957.* Washington. U.S. Government Printing Office, 1960.

(*64*) American Hospital Association: *Hospital Accreditation References.* Chicago. American Hospital Association, 1965.

(*65*) American Hospital Association: Hospitals Guide Issue, Part 2. *J.A.H.A.* Chicago, August 1968.

Table 153. SHORT-STAY HOSPITALS BY TYPE AND STATE: 1967

Location	Total short-stay hospitals	General hospitals	Specialty hospitals
United States	6, 839	6, 508	331
Alabama	138	135	3
Alaska	25	25	—
Arizona	79	75	4
Arkansas	111	110	1
California	586	548	38
Colorado	93	88	5
Connecticut	40	39	1
Delaware	8	8	—
District of Columbia	15	13	2
Florida	206	195	11
Georgia	181	172	9
Hawaii	21	20	1
Idaho	48	48	—
Illinois	267	254	13
Indiana	119	113	6
Iowa	141	139	2
Kansas	157	156	1
Kentucky	128	124	4
Louisiana	156	154	2
Maine	63	62	1
Maryland	56	52	4
Massachusetts	151	129	22
Michigan	252	238	14
Minnesota	186	185	1
Mississippi	134	128	6
Missouri	165	157	8
Montana	71	68	3
Nebraska	117	115	2
Nevada	23	22	1
New Hampshire	34	33	1
New Jersey	110	104	6
New Mexico	64	60	4
New York	367	342	25
North Carolina	157	148	9
North Dakota	63	63	—
Ohio	221	209	12
Oklahoma	168	160	8
Oregon	88	84	4
Pennsylvania	271	251	20
Rhode Island	19	16	3
South Carolina	95	90	5
South Dakota	71	70	1
Tennessee	172	161	11
Texas	624	596	28
Utah	43	42	1
Vermont	25	23	2
Virginia	121	110	11
Washington	99	94	5
West Virginia	89	84	5
Wisconsin	169	164	5
Wyoming	32	32	—

Table 154. BEDS, AVERAGE DAILY PATIENTS AND ADMISSIONS IN SHORT-STAY HOSPITALS BY STATE: 1967

Location	Number			Number per 1,000 population[1]		
	Beds	Average daily patients	Admissions	Beds	Average daily patients	Admissions
United States	901, 738	676, 719	29,642,544	4. 6	3. 4	149. 8
Alabama	14, 271	10, 615	500, 742	4. 0	3. 0	141. 5
Alaska	1, 028	611	29, 111	3. 8	2. 2	107. 0
Arizona	7, 368	5, 257	243, 284	4. 5	3. 2	148. 9
Arkansas	8, 133	5, 603	296, 694	4. 1	2. 8	150. 8
Caifornia	80, 186	57, 624	2, 618, 967	4. 2	3. 0	136. 7
Colorado	12, 269	8, 862	828, 073	6. 2	4. 5	419. 3
Connecticut	9, 961	8, 082	368, 495	3. 4	2. 8	126. 0
Delaware	1, 791	1, 353	61, 623	3. 4	2. 6	117. 8
District of Columbia	5, 619	4, 406	179, 547	6. 9	5. 4	221. 9
Florida	27, 820	20, 247	911, 143	4. 6	3. 4	152. 0
Georgia	18, 808	13, 437	698, 506	4. 2	3. 0	154. 9
Hawaii	2, 055	1, 346	70, 217	2. 8	1. 8	95. 0
Idaho	2, 908	1, 869	100, 997	4. 2	2. 7	144. 5
Illinois	55, 249	43, 260	1, 644, 824	5. 1	4. 0	151. 0
Indiana	19, 448	15, 740	685, 568	3. 9	3. 1	137. 1
Iowa	15, 893	11, 421	472, 426	5. 8	4. 1	171. 6
Kansas	12, 014	8, 442	359, 563	5. 3	3. 7	158. 0
Kentucky	13, 979	10, 143	488, 247	4. 4	3. 2	153. 1
Louisiana	16, 700	11, 736	590. 816	4. 6	3. 2	161. 3
Maine	4, 491	3, 139	151, 065	4. 6	3. 2	155. 3
Maryland	13, 071	10, 105	378, 335	3. 5	2. 7	102. 8
Massachusetts	27, 947	21, 628	828, 674	5. 2	4. 0	152. 9
Michigan	37, 933	29, 915	1, 281, 092	4. 4	3. 5	149. 2
Minnesota	20, 713	14, 824	628, 519	5. 8	4. 1	175. 5
Mississippi	9, 009	6, 167	335, 646	3. 8	2. 6	142. 9
Missouri	23, 901	18, 406	746, 940	5. 2	4. 0	162. 3
Montana	4, 283	2, 768	140, 969	6. 1	3. 9	201. 1
Nebraska	9, 179	6, 544	249, 501	6. 4	4. 6	173. 9
Nevada	2, 190	1, 501	69, 247	4. 9	3. 4	156. 0
New Hampshire	3, 213	2, 236	104, 332	4. 7	3. 3	152. 1
New Jersey	27, 626	21, 911	856, 891	3. 9	3. 1	122. 4
New Mexico	4, 431	2, 971	158, 235	4. 4	3. 0	157. 8
New York	84, 399	66, 900	2, 405, 532	4. 6	3. 6	131. 2
North Carolina	19, 413	14, 779	709, 184	3. 9	2. 9	141. 0
North Dakota	4, 238	3, 039	129, 023	6. 6	4. 8	201. 9
Ohio	42, 449	34, 977	1, 456, 426	4. 1	3. 3	139. 3
Oklahoma	14, 777	10, 842	407, 289	5. 9	4. 3	163. 2
Oregon	8, 983	5, 959	488, 363	4. 5	3. 0	244. 3
Pennsylvania	56, 904	45, 100	1, 692, 071	4. 9	3. 9	145. 5
Rhode Island	4, 189	3, 071	122, 556	4. 7	3. 4	136. 2
South Carolina	11, 420	8, 324	372, 505	4. 4	3. 2	143. 3
South Dakota	3, 898	2, 555	124, 594	5. 8	3. 8	184. 9
Tennessee	17, 202	13, 339	634, 320	4. 4	3. 4	163. 0
Texas	52, 510	36, 718	1, 804, 094	4. 8	3. 4	166. 0
Utah	4, 064	2, 835	147, 675	4. 0	2. 8	144. 2
Vermont	2, 164	1, 584	69, 611	5. 2	3. 8	166. 9
Virginia	17, 963	14, 057	566, 521	4. 0	3. 1	124. 9
Washington	10, 435	6, 780	353, 592	3. 4	2. 2	114. 5
West Virginia	9, 610	7, 244	331, 003	5. 3	4. 0	184. 1
Wisconsin	21, 623	15, 296	691, 138	5. 2	3. 7	165. 0
Wyoming	2, 010	1, 151	58, 758	6. 4	3. 7	186. 5

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[1] U.S. Bureau of the Census: Population estimates. *Current Population Reports*. Series P-25, No. 380. Nov. 1967.

Table 155. EMPLOYEES IN SHORT-STAY HOSPITALS, BY STATE: 1967

Location	Total employees	Full-time employees (more than 35 hours)	Part-time employees (less than 35 hours)	Full-time employees per 1,000 average daily patients
United States	1, 956, 454	1, 583, 641	387, 193	2, 340
Alabama	28, 840	25, 588	3, 784	2, 411
Alaska	1, 531	1, 348	306	2, 206
Arizona	16, 065	14, 020	2, 060	2, 667
Arkansas	14, 602	12, 216	2, 109	2, 180
California	173, 809	145, 191	31, 784	2, 519
Colorado	27, 482	22, 917	4, 958	2, 586
Connecticut	27, 798	20, 121	7, 648	2, 489
Delaware	4, 695	3, 816	869	2, 820
District of Columbia	13, 769	12, 339	2, 219	2, 800
Florida	57, 685	51, 403	7, 250	2, 539
Georgia	38, 422	32, 883	5, 090	2, 447
Hawaii	3, 987	3, 331	640	2, 475
Idaho	5, 472	4, 083	1, 530	2, 185
Illinois	118, 877	92, 207	25, 233	2, 131
Indiana	43, 059	34, 270	8, 817	2, 177
Iowa	30, 914	21, 801	8, 959	1, 909
Kansas	24, 972	20, 494	5, 352	2, 428
Kentucky	27, 547	23, 201	4, 250	2, 287
Louisiana	30, 760	28, 114	4, 268	2, 396
Maine	9, 993	7, 681	2, 477	2, 447
Maryland	31, 628	25, 590	5, 955	2, 532
Massachusetts	72, 848	55, 545	19, 121	2, 568
Michigan	90, 161	70, 880	17, 904	2, 369
Minnesota	44, 348	30, 207	14, 166	2, 038
Mississippi	15, 454	13, 942	2, 149	2, 261
Missouri	51, 494	41, 642	9, 874	2, 262
Montana	7, 770	5, 966	1, 965	2, 155
Nebraska	18, 851	13, 196	5, 987	2, 017
Nevada	3, 995	3, 508	489	2, 337
New Hampshire	6, 835	4, 734	2, 134	2, 117
New Jersey	60, 063	45, 036	15, 169	2, 056
New Mexico	8, 101	7, 444	1, 234	2, 505
New York	216, 906	173, 044	42, 190	2, 587
North Carolina	35, 425	32, 224	4, 292	2, 180
North Dakota	7, 463	6, 237	1, 646	2, 052
Ohio	102, 104	80, 921	20, 972	2, 314
Oklahoma	25, 632	22, 379	3, 902	2, 064
Oregon	18, 202	14, 302	3, 828	2, 400
Pennsylvania	124, 508	98, 902	26, 151	2, 193
Rhode Island	11, 790	8, 607	3, 259	2, 803
South Carolina	20, 029	18, 070	2, 617	2, 171
South Dakota	6, 616	4, 570	1, 868	1, 789
Tennessee	36, 985	33, 474	4, 346	2, 509
Texas	100, 293	89, 162	14, 371	2, 428
Utah	9, 695	5, 883	2, 316	2, 075
Vermont	4, 835	3, 631	1, 234	2, 292
Virginia	37, 378	31, 844	6, 101	2, 265
Washington	22, 007	17, 606	5, 041	2, 597
West Virginia	17, 322	14, 817	2, 763	2, 045
Wisconsin	44, 124	30, 563	13, 766	1, 998
Wyoming	3, 313	2, 691	780	2, 338

Table 156. BEDS MAINTAINED IN SHORT-STAY HOSPITALS, BY TYPE OF SERVICE AND STATE: 1967

Location	Total beds	Medical/ surgical	Obstetrical	Pediatric	Psychiatric	Tuberculosis	Rehabilitation	Chronic disease	Nursing/ convalescent	All other
United States	901, 738	644, 306	81, 690	72, 482	36, 320	7, 396	6, 608	7, 316	16, 857	27, 854
Alabama	14, 271	10, 490	1, 307	911	383	—	46	26	388	720
Alaska	1, 028	649	129	168	—	1	—	—	38	43
Arizona	7, 368	5, 174	634	863	195	90	10	39	264	99
Arkansas	8, 133	6, 143	812	402	91	—	—	—	168	517
California	80, 186	56, 204	6, 606	5, 873	3, 668	1, 447	878	1, 306	2, 231	1, 973
Colorado	12, 269	8, 429	1, 005	1, 112	646	260	21	—	472	324
Connecticut	9, 961	7, 405	1, 142	970	229	—	51	52	33	79
Delaware	1, 791	1, 224	227	222	—	—	60	—	—	58
District of Columbia	5, 619	4, 074	540	494	125	67	—	124	14	181
Florida	27, 820	21, 293	2, 065	1, 992	1, 495	25	194	27	106	623
Georgia	18, 808	14, 113	1, 511	1, 008	593	—	162	16	526	879
Hawaii	2, 055	1, 304	291	266	28	—	8	—	122	36
Idaho	2, 908	1, 980	351	238	19	—	33	—	148	139
Illinois	55, 249	39, 538	4, 536	4, 764	3, 401	343	427	269	510	1, 461
Indiana	19, 448	13, 608	2, 019	1, 841	808	288	59	249	164	412
Iowa	15, 893	10, 868	1, 486	1, 373	548	46	167	47	585	773
Kansas	12, 014	8, 626	1, 197	767	310	21	61	71	560	401
Kentucky	13, 979	10, 423	1, 271	1, 036	731	—	—	54	289	175
Louisiana	16, 700	11, 382	1, 331	1, 162	373	362	—	99	82	1, 909
Maine	4, 491	3, 317	539	408	26	—	52	41	25	83
Maryland	13, 071	8, 339	1, 333	1, 201	329	302	—	534	161	872
Massachusetts	27, 947	19, 952	2, 448	2, 480	1, 859	—	140	414	56	598
Michigan	37, 933	28, 326	3, 356	3, 677	1, 198	123	255	166	394	438
Minnesota	20, 713	14, 261	1, 959	1, 699	749	—	183	139	1, 466	257
Mississippi	9, 009	6, 901	774	416	145	15	121	8	35	594
Missouri	23, 901	16, 724	1, 870	1, 602	1, 185	151	262	354	234	1, 519
Montana	4, 283	2, 833	446	395	46	—	—	84	410	69
Nebraska	9, 179	6, 179	769	539	470	—	49	490	589	94
Nevada	2, 190	1, 481	168	140	73	—	38	—	262	28
New Hampshire	3, 213	2, 290	405	342	—	—	—	—	80	96
New Jersey	27, 626	18, 334	2, 900	2, 397	2, 474	92	142	256	168	863
New Mexico	4, 431	2, 947	554	504	110	15	30	105	109	57
New York	84, 399	58, 387	7, 254	6, 979	3, 149	2, 202	867	607	1, 029	3, 925
North Carolina	19, 413	14, 596	1, 934	1, 407	400	—	31	66	179	800
North Dakota	4, 238	2, 865	476	517	95	—	—	30	103	152
Ohio	42, 449	30, 692	4, 364	3, 858	1, 736	428	229	314	353	475
Oklahoma	14, 777	9, 914	1, 064	578	1, 807	74	256	117	271	696
Oregon	8, 983	6, 083	826	593	364	138	20	—	727	232
Pennsylvania	56, 904	42, 749	5, 270	5, 272	1, 869	156	300	431	410	447
Rhode Island	4, 189	3, 031	387	459	247	—	—	—	—	65
South Carolina	11, 420	8, 168	1, 000	670	318	100	64	57	295	748
South Dakota	3, 898	2, 595	462	457	61	4	—	4	121	194
Tennessee	17, 202	12, 933	1, 426	1, 062	368	80	12	234	196	891
Texas	52, 535	39, 103	4, 639	3, 399	2, 144	198	458	209	822	1, 563
Utah	4, 064	2, 630	485	390	361	36	12	52	78	20
Vermont	2, 164	1, 667	222	205	49	—	—	—	15	6
Virginia	17, 963	12, 816	1, 887	1, 516	601	234	498	9	49	353
Washington	10, 435	7, 299	869	924	277	82	92	—	524	368
West Virginia	9, 610	7, 406	867	765	162	—	—	74	77	259
Wisconsin	21, 623	15, 145	2, 057	1, 997	502	16	320	138	724	724
Wyoming	2, 010	1, 416	220	172	3	—	—	4	195	—

Table 157. LONG-STAY HOSPITALS, BY TYPE AND STATE: 1967

Location	Total	General	Psychiatric	Geriatric and chronic	Tuberculosis	Other
United States	1,308	177	473	307	166	185
Alabama	14	—	4	—	7	3
Alaska	4	1	1	2	—	—
Arizona	9	4	3	0	2	—
Arkansas	13	2	2	4	2	3
California	164	19	47	77	9	12
Colorado	16	1	5	3	1	6
Connecticut	28	4	13	5	1	5
Delaware	7	2	2	1	1	1
District of Columbia	7	3	2	1	—	1
Florida	17	2	8	—	2	5
Georgia	12	4	3	1	1	3
Hawaii	11	2	2	2	1	4
Idaho	4	1	1	—	1	1
Illinois	61	5	23	6	22	5
Indiana	25	4	10	2	6	3
Iowa	16	2	9	1	1	3
Kansas	14	4	5	3	2	—
Kentucky	20	1	6	1	8	4
Louisiana	14	2	4	3	1	4
Maine	11	2	4	4	1	—
Maryland	32	4	15	6	4	3
Massachusetts	69	6	23	26	3	11
Michigan	80	8	18	36	7	11
Minnesota	23	3	12	1	3	4
Mississippi	10	3	4	1	1	1
Missouri	21	2	9	4	3	3
Montana	2	—	1	—	1	—
Nebraska	14	2	4	5	1	2
Nevada	2	1	1	—	—	—
New Hampshire	12	1	3	5	1	2
New Jersey	38	7	13	8	5	5
New Mexico	4	1	1	—	1	1
New York	94	13	44	19	7	11
North Carolina	24	5	6	2	4	7
North Dakota	5	2	1	1	—	1
Ohio	63	7	24	15	11	6
Oklahoma	11	1	3	3	2	2
Oregon	17	1	5	8	—	3
Pennsylvania	85	11	34	17	6	17
Rhode Island	6	3	3	—	—	—
South Carolina	12	3	4	1	3	1
South Dakota	5	2	2	—	—	1
Tennessee	25	4	6	5	6	4
Texas	60	10	18	11	9	12
Utah	7	2	1	2	1	1
Vermont	4	—	3	—	1	—
Virginia	23	3	9	4	3	4
Washington	10	3	5	—	—	2
West Virginia	11	1	4	4	1	1
Wisconsin	68	3	41	7	12	5
Wyoming	4	—	2	—	1	1

Table 158. BEDS, AVERAGE DAILY PATIENTS AND ADMISSIONS IN LONG-STAY HOSPITALS, BY STATE: 1967

Location	Number			Number per 1,000 population [1]		
	Beds	Average daily patients	Admissions	Beds	Average daily patients	Admissions
United States	729, 363	664, 210	1, 101, 084	3. 7	3. 4	5. 6
Alabama	12, 037	11, 341	11, 084	3. 4	3. 2	3. 1
Alaska	865	722	3, 912	3. 2	2. 7	14. 4
Arizona	2, 472	2, 663	9, 801	1. 5	1. 6	6. 0
Arkansas	6, 567	5, 672	15, 647	3. 3	2. 9	8. 0
California	55, 501	51, 114	109, 610	2. 9	2. 7	5. 7
Colorado	5, 309	5, 490	9, 113	2. 7	2. 8	4. 6
Connecticut	13, 073	10, 598	20, 807	4. 5	3. 6	7. 1
Delaware	4, 173	3, 999	6, 596	8. 0	7. 6	12. 6
District of Columbia	10, 002	10, 915	28, 151	12. 4	13. 5	34. 8
Florida	13, 693	12, 291	21, 232	2. 3	2. 1	3. 5
Georgia	16, 931	15, 422	20, 492	3. 8	3. 4	4. 5
Hawaii	2, 439	2, 089	7, 646	3. 3	2. 8	10. 3
Idaho	892	790	1, 276	1. 3	1. 1	1. 8
Illinois	41, 507	38, 267	58, 652	3. 8	3. 5	5. 4
Indiana	15, 335	13, 691	10, 989	3. 1	2. 7	2. 2
Iowa	4, 433	3, 826	9, 053	1. 6	1. 4	3. 3
Kansas	5, 664	4, 858	13, 319	2. 5	2. 1	5. 9
Kentucky	8, 525	7, 599	21, 588	2. 7	2. 4	6. 8
Louisiana	9, 450	8, 163	19, 410	2. 6	2. 2	5. 3
Maine	4, 331	3, 915	6, 571	4. 5	4. 0	6. 8
Maryland	15. 838	14, 142	41, 364	4. 3	3. 8	11. 2
Massachusetts	31, 085	27, 155	38, 233	5. 7	5. 0	7. 1
Michigan	32, 009	29, 677	39, 723	3. 7	3. 5	4. 6
Minnesota	9, 504	8, 749	23, 076	2. 7	2. 4	6. 4
Mississippi	8, 212	6, 890	12, 951	3. 5	2. 9	5. 5
Missouri	14, 664	13, 244	13, 633	3. 2	2. 9	3. 0
Montana	1, 721	1, 595	2, 382	2. 5	2. 3	3. 4
Nebraska	4, 510	3, 900	4, 923	3. 1	2. 7	3. 4
Nevada	606	554	1, 313	1. 4	1. 2	3. 0
New Hampshire	3, 667	3, 140	3, 806	5. 3	4. 6	5. 5
New Jersey	26, 292	23, 653	26, 843	3. 8	3. 4	3. 8
New Mexico	1, 498	1, 307	7, 774	1. 5	1. 3	7. 8
New York	118, 525	112, 266	121, 400	6. 5	6. 1	6. 6
North Carolina	14, 016	12, 495	40, 638	2. 8	2. 5	8. 1
North Dakota	1, 712	1, 530	4, 172	2. 7	2. 4	6. 5
Ohio	34, 962	29, 616	47, 561	3. 3	2. 8	4. 5
Oklahoma	3, 691	3, 170	7, 126	1. 5	1. 3	2. 9
Oregon	5, 446	4, 083	9, 325	2. 7	2. 0	4. 7
Pennsylvania	55, 233	50, 445	56, 635	4. 7	4. 3	4 9
Rhode Island	4, 656	4, 417	8, 578	5. 2	4. 9	9. 5
South Carolina	7, 988	7, 555	12, 897	3. 1	2. 9	5. 0
South Dakota	2, 581	2, 343	6, 572	3. 8	3. 5	9. 8
Tennessee	13, 957	12, 917	30, 397	3. 6	3. 3	7. 8
Texas	26, 433	24, 171	49, 866	2. 4	2. 2	4. 6
Utah	2, 065	1, 792	2, 314	2. 0	1. 8	2. 3
Vermont	1, 894	1, 597	1, 224	4. 5	3. 8	2. 9
Virginia	18, 601	16, 891	29, 305	4. 1	3. 7	6. 5
Washington	6, 405	5, 688	10, 434	2. 1	1. 8	3. 4
West Virginia	6, 457	6, 019	9, 832	3. 6	3. 3	5. 5
Wisconsin	20, 513	18, 619	30, 541	4. 9	4. 4	7. 3
Wyoming	1, 423	1, 164	1, 297	4. 5	3. 7	4. 1

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[1] U.S. Bureau of the Census: Population estimates. *Current Population Reports.* Series P-25, No. 380. Nov. 1967.

Table 159. EMPLOYEES IN LONG-STAY HOSPITALS, BY STATE: 1967

Location	Total employees	Full-time employees (more than 35 hours)	Part-time employees (less than 35 hours)	Full-time employees per 1,000 average daily patients
United States	469, 300	431, 210	35, 618	649
Alabama	4, 904	4, 730	197	417
Alaska	963	888	36	1, 229
Arizona	2, 259	2, 164	196	813
Arkansas	5, 064	4, 774	299	842
California	41, 687	37, 231	3, 730	728
Colorado	6, 110	4, 999	556	911
Connecticut	10, 096	8, 899	1, 232	839
Delaware	3, 059	2, 466	137	617
District of Columbia	8, 686	8, 433	253	773
Florida	7, 621	7, 510	108	611
Georgia	6, 456	6, 234	153	404
Hawaii	1, 816	1, 715	101	821
Idaho	640	644	33	815
Illinois	26, 876	25, 239	1, 706	659
Indiana	8, 543	8, 168	462	597
Iowa	3, 916	3, 556	381	929
Kansas	5, 737	5, 462	346	1, 124
Kentucky	5, 482	5, 170	307	680
Louisiana	5, 690	5, 434	190	666
Maine	2, 421	1, 491	166	381
Maryland	14, 919	13, 816	1, 177	977
Massachusetts	23, 732	20, 873	3, 148	769
Michigan	20, 225	17, 777	2, 069	599
Minnesota	7, 265	6, 637	700	759
Mississippi	3, 839	3, 765	111	546
Missouri	9, 348	8, 063	598	609
Montana	831	802	29	503
Nebraska	3, 247	3, 002	371	769
Nevada	333	325	26	587
New Hampshire	2, 107	2, 168	180	690
New Jersey	16, 988	15, 516	1, 528	656
New Mexico	1, 402	1, 361	53	1, 041
New York	69, 509	65, 157	4, 847	580
North Carolina	9, 799	9, 164	618	733
North Dakota	928	852	75	557
Ohio	20, 507	19, 217	1, 450	649
Oklahoma	2, 161	1, 979	195	624
Oregon	3, 132	2, 845	282	697
Pennsylvania	34, 740	31, 525	2, 771	625
Rhode Island	3, 252	3, 156	122	715
South Carolina	2, 859	2, 538	202	336
South Dakota	2, 232	2, 103	190	898
Tennessee	8, 216	7, 904	346	612
Texas	15, 107	14, 298	993	592
Utah	1, 323	1, 161	99	648
Vermont	910	868	34	544
Virginia	10, 443	9, 747	585	577
Washington	4, 252	4, 048	218	712
West Virginia	3, 431	3, 269	190	543
Wisconsin	13, 302	11, 238	1, 758	604
Wyoming	935	829	64	712

Table 160. BEDS MAINTAINED IN LONG-STAY HOSPITALS BY TYPE OF SERVICE AND STATE: 1967

Location	Total beds	Medical/ surgical	Obstetrical	Pediatric	Psychiatric	Tuberculosis	Rehabilitation	Chronic disease	Nursing/ convalescent	All other
United States	729, 363	71, 481	753	4, 030	478, 813	40, 049	15, 673	34, 382	27, 254	40, 129
Alabama	12, 037	433	6	—	8, 416	1, 260	111	—	1, 633	178
Alaska	865	400	8	90	225	45	—	32	65	—
Arizona	2, 472	529	8	10	1, 332	460	30	48	55	—
Arkansas	6, 567	1, 176	4	—	3, 199	647	570	212	109	650
California	55, 501	8, 682	77	283	29, 382	3, 026	2, 005	2, 978	4, 604	4,464
Colorado	5, 309	343	—	180	2, 495	199	36	765	177	1,114
Connecticut	13, 073	1, 254	—	248	8, 346	555	168	922	1, 450	130
Delaware	4, 173	464	—	—	1, 273	154	—	934	289	1,059
District of Columbia	10, 002	2, 531	31	89	6, 312	50	—	197	—	792
Florida	13, 693	1, 239	—	—	9, 556	1, 160	130	—	—	1,608
Georgia	16, 931	1, 146	—	—	12, 023	1, 009	170	—	171	2,412
Hawaii	2, 439	158	19	29	802	281	36	1, 024	—	90
Idaho	892	54	—	—	736	65	37	—	—	—
Illinois	41, 507	3, 714	4	70	29, 385	3, 004	1, 525	1, 484	1, 619	702
Indiana	15, 335	1, 090	—	—	12, 123	785	106	178	488	565
Iowa	4, 433	228	14	3	3, 602	200	105	47	197	37
Kansas	5, 664	1, 059	3	2	4, 035	190	16	34	171	154
Kentucky	8, 525	393	30	206	5, 693	1, 006	30	100	101	966
Louisiana	9, 450	1, 236	40	90	5, 880	509	283	426	264	722
Maine	4, 331	408	4	4	3, 456	140	—	125	120	74
Maryland	15, 838	1, 750	—	65	10, 435	1, 112	205	1, 549	1	721
Massachusetts	31, 085	2, 115	45	88	18, 056	721	771	6, 111	317	2,861
Michigan	32, 009	2, 607	18	113	17, 788	1, 867	1, 144	1, 964	2, 015	4,493
Minnesota	9, 504	1, 408	18	159	6, 309	295	130	—	400	85
Mississippi	8, 212	734	3	—	5, 657	631	60	62	63	1,002
Missouri	14, 664	704	42	115	6, 742	1, 271	283	2, 332	661	2, 514
Montana	1, 721	291	—	—	1, 275	—	—	—	—	155
Nebraska	4, 510	375	12	31	3, 033	135	231	178	97	418
Nevada	606	18	1	—	337	—	—	—	88	162
New Hampshire	3, 667	313	—	—	2, 154	82	125	339	632	22
New Jersey	26, 292	2, 293	—	173	17, 843	1, 784	352	1, 831	325	1, 691
New Mexico	1, 498	475	—	—	755	168	100	—	—	—
New York	118, 525	9, 127	10	1, 155	89, 984	3, 416	2, 578	2, 674	2, 408	7,173
North Carolina	14, 016	1, 421	98	48	8, 935	1, 507	689	134	371	813
North Dakota	1, 712	379	15	10	1, 170	—	54	49	35	—
Ohio	34, 962	4, 157	28	120	24, 839	1, 674	252	508	1, 604	1,780
Oklahoma	3, 691	90	14	2	2, 485	520	66	112	380	22
Oregon	5, 446	303	—	80	3, 234	13	146	181	902	587
Pennsylvania	55, 221	5, 438	98	285	37, 719	2, 500	963	2, 136	2, 641	3,441
Rhode Island	4, 656	902	—	15	2, 097	172	—	285	2	1,183
South Carolina	7, 988	634	6	—	6, 310	722	—	17	219	80
South Dakota	2, 581	502	—	—	1, 842	—	71	79	75	12
Tennessee	13, 957	1, 247	—	40	7, 631	952	308	888	121	2, 770
Texas	26, 433	2, 505	70	227	19, 139	2, 339	476	62	681	934
Utah	2, 065	444	—	—	571	735	—	231	—	84
Vermont	1, 894	—	—	—	1, 819	75	—	—	—	—
Virginia	18, 601	2, 205	—	—	11, 095	799	697	928	78	2,799
Washington	6, 405	919	9	—	2, 631	30	205	765	—	1,846
West Virginia	6, 457	346	—	—	4, 485	822	60	298	176	270
Wisconsin	20, 509	1, 191	18	—	13, 059	951	314	1, 082	1, 449	2,445
Wyoming	1, 423	51	—	—	1, 113	11	35	81	—	132

CHAPTER 37

Nursing Care and Related Homes

The Nursing home is a relatively new institution in the United States. "Prior to the thirties, only a few such homes existed. With the enactment of the Social Security Act in 1935, which made Federal funds available to the needy aged, the number of proprietary boarding and nursing homes for elderly persons began to flourish and public almshouses subsequently declined." (*66*) The growing number of elderly persons, changes in the pattern of illness resulting from advances in medical technology, and changes in family living arrangements have resulted in a growing demand for the provision of limited medical and nursing care outside of hospitals.

The 1965 amendments to the Social Security Act (Public Law 89–97) provides for the financing of up to 100 days of extended care services for persons 65 and over in a certified facility during a single spell of illness. This will undoubtedly provide an impetus to the development of new nursing care facilities and the modification of existing facilities, since extended care represents a new level of care designed to provide skilled nursing services in a high quality extended care facility at less cost than in a hospital (*67*).

In 1939, the first national count of nursing homes by the Bureau of the Census indicated that there were 1,200 nursing, convalescent, and rest homes with approximately 25,000 beds (*68*). According to the 1954 national inventory of nursing homes and related facilities conducted by the Division of Hospital and Medical Facilities of the Public Health Service, there was a total of about 25,000 homes of all types with approximately 450,000 beds. These facilities range from the boarding home for aged persons which provides only the simplest supportive services to the professional type of nursing home providing highly skilled and intensive nursing care (*66*).

In 1967, there were 19,141 establishments providing nursing or personal care. These consisted of 10,636 nursing care homes, 3,853 personal care with nursing care homes, 4,396 personal care without nursing care homes, and 256 domiciliary care homes. California led the Nation in the number of nursing care and related homes followed by Ohio and New York. In 11 States three out of four of the nursing care and related homes were classified as "nursing care" homes (table 161).

The number of beds in nursing care and related homes has increased by almost 50 percent since 1963. In 1967, the 584,052 beds in nursing care homes accounted for 69 percent of the total beds in all kinds of nursing care and related homes for the chronically ill and aged. An additional 262,502 beds were available in homes providing personal care with nursing, personal care, and domiciliary care (table 146).

A little less than half of the nursing care and related homes had less than 25 beds and only 9 percent had more than 99 beds. Nursing care homes on the average maintained more beds than the various types of personal and domiciliary facilities (tables 150 and 151).

As of 1967, 77 percent of nursing care and related homes were proprietary, i.e., privately owned and operated for profit. Voluntary nonprofit homes, including those owned and operated by fraternal groups and religious orders, constituted 15 percent of all "homes." The "homes" owned and operated by public agencies (local, State, and Federal governments) comprised an additional 8 percent (table 149).

In 1967, there were almost 400,000 persons employed full time in 19,141 nursing care and related homes in the United States. Those employees were serving over three-quarters of a million residents (table 162).

Although some States had licensure programs for nursing homes in the early 1920's, the majority of the States did not enact statutes until after World War II. Nursing homes are required to be licensed currently in each of the 50 States and the District of Columbia—in 46 by the departments of health, in three by the departments of welfare, in one by the State

Department of Hospitals, and in one by the Department of Institutions and Agencies. The minimum standards, rules, and regulations for nursing homes and related facilities in all 50 States show little uniformity in terminology, definitions, or in requirements. As used in the various State regulations, the term "nursing home" can mean anything from a facility which provides care comparable to that provided by a hospital (excluding surgery) to a facility which offers no more than room and board of limited quality (*69*).

Unlike licensure, the accreditation program is voluntary for the various types of nursing homes. Previous to 1966, two national organizations, the American Hospital Association and the National Council for Accreditation of Nursing Homes, approved or accredited health care facilities other than hospitals in all States. In California, a third organization, the California Commission for the Accreditation of Nursing Homes and Related Facilities also initiated voluntary accreditation standards. In 1966, the Joint Commission on Accreditation of Hospitals undertook, in addition to hospitals, the responsibility for the accreditation of nursing and personal facilities. Accreditation by the JCAH may be granted to extended care facilities, nursing care facilities, and resident care facilities for 3 years or 1 year, or it may be withheld, depending upon the quality of care provided. At the end of the accreditation period (either 3 years or 1 year), the facilities request a resurvey to determine accreditation eligibility. A facility denied accreditation may request another survey to determine its accreditation eligibility, usually after 6 months have elapsed from the denial survey (*70*). If qualified, the facility is then accredited.

The JCAH also offers a nonaccreditation survey to extended care facilities, nursing care facilities and resident care facilities. This is a consultative survey and would be requested by a facility aware that it cannot meet accreditation standards but desiring help in order to meet the standards in the future.

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(*67*) Allen, D.: Health insurance for the aged: Participating extended care facilities. *Social Security Bulletin*. Social Security Administration, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, June 1967.

(*68*) Block, L.: Hospital and other institutional facilities and services, 1939. *Vital Statistics—Special Report*, Vol. 13, Nos. 1–57. U.S. Bureau of the Census. Washington. U.S. Government Printing Office, 1942.

(*69*) Edward, E.: *Nursing Homes and Related Facilities, A Review of the Literature*. Public Health Reports, Vol. 83, No. 8. Public Health Service, U.S. Department of Health, Education, and Welfare. Washington. U.S. Government Printing Office, 1968.

(*70*) Joint Commission on Accreditation of Hospitals: *Standards for Accreditation of Extended Care Facilities, Nursing Care Facilities and Resident Care Facilities*. Chicago, January 1968.

Table 161. NURSING CARE AND RELATED HOMES, BY TYPE AND STATE: 1967

Location	Total	Nursing care	Personal care		Domiciliary care
			With nursing care	Without nursing care	
United States	19, 141	10, 636	3, 853	4, 396	256
Alabama	152	128	19	5	—
Alaska	4	3	—	1	—
Arizona	78	53	15	9	1
Arkansas	177	165	9	3	—
California	2, 973	974	451	1, 471	77
Colorado	164	136	18	10	—
Connecticut	366	224	57	72	13
Delaware	33	23	6	4	—
District of Columbia	85	34	29	21	1
Florida	327	244	43	34	6
Georgia	198	154	26	17	1
Hawaii	88	18	24	46	—
Idaho	56	44	4	7	1
Illinois	914	525	198	184	7
Indiana	471	315	80	68	8
Iowa	731	365	172	189	5
Kansas	473	171	218	82	2
Kentucky	294	109	125	57	3
Louisiana	188	173	12	3	—
Maine	293	128	57	97	11
Maryland	198	147	33	14	4
Massachusetts	952	631	155	164	2
Michigan	517	367	85	57	8
Minnesota	485	283	74	122	6
Mississippi	107	61	22	24	—
Missouri	436	266	124	42	4
Montana	82	45	20	15	2
Nebraska	279	97	121	59	2
Nevada	22	7	4	11	—
New Hamsphire	137	92	32	12	1
New Jersey	507	239	71	183	14
New Mexico	58	28	9	20	1
New York	1, 081	571	197	293	20
North Carolina	666	109	227	319	11
North Dakota	92	29	26	37	—
Ohio	1, 126	779	233	113	1
Oklahoma	445	375	57	12	1
Oregon	271	162	38	69	2
Pennsylvania	789	522	178	85	4
Rhode Island	170	87	25	56	2
South Carolina	93	75	12	6	—
South Dakota	125	62	40	23	—
Tennessee	219	150	31	31	7
Texas	866	661	138	61	6
Utah	130	65	47	18	—
Vermont	121	70	17	27	7
Virginia	269	132	59	69	9
Washington	262	193	51	15	3
West Virginia	64	42	15	7	—
Wisconsin	477	289	142	44	2
Wyoming	30	14	7	8	1

Table 162. BEDS, RESIDENTS, AND FULL-TIME EMPLOYEES IN NURSING CARE AND RELATED HOMES BY STATE: 1967

Location	Number			Number per 1,000[1] population 65 and over		Full-time employees per 1,000 residents
	Beds	Residents	Employees (full time)	Beds	Residents	
United States	846, 554	756, 239	383, 158	45. 0	40. 2	507
Alabama	8, 806	8, 231	5, 373	30. 0	28. 0	653
Alaska	139	123	60	19. 9	17. 6	488
Arizona	3, 998	3, 780	1, 992	31. 5	29. 8	527
Arkansas	10, 478	9, 762	4, 613	49. 0	45. 6	473
California	85, 105	77, 234	38, 566	51. 8	47. 0	499
Colorado	10, 918	10, 192	5, 554	62. 7	58. 6	545
Connecticut	15, 924	14, 216	7, 214	58. 5	52. 3	507
Delaware	1, 429	1, 283	765	35. 7	32. 1	596
District of Columbia	2, 071	1, 910	1, 123	29. 2	26. 9	588
Florida	22, 139	19, 318	11, 228	28. 5	24. 9	581
Georgia	11, 236	10, 419	5, 872	33. 6	31. 2	564
Hawaii	1, 327	1, 223	628	33. 2	30. 6	513
Idaho	2, 978	2, 754	1, 620	45. 8	42. 4	588
Illinois	49, 478	44, 623	21, 931	45. 1	40. 6	491
Indiana	21, 929	19, 266	10, 255	46. 1	40. 5	532
Iowa	27, 998	25, 071	10, 057	80. 9	72. 5	401
Kansas	17, 372	15, 692	7, 180	67. 1	60. 6	458
Kentucky	11, 841	10, 689	4, 706	37. 5	33. 8	440
Louisiana	10, 313	9, 167	5, 238	37. 1	33. 0	571
Maine	5, 704	5, 222	2, 638	51. 4	47. 0	505
Maryland	10, 409	9, 474	5, 454	38. 8	35. 4	576
Massachusetts	38, 604	35, 566	16, 291	64. 0	59. 0	458
Michigan	28, 739	26, 599	15, 685	38. 6	35. 8	590
Minnesota	28, 837	27, 009	11, 111	73. 2	68. 6	411
Mississippi	3, 766	3, 153	1, 742	18. 3	15. 3	552
Missouri	22, 860	20, 680	10, 189	41. 6	37. 7	493
Montana	3, 170	2, 838	1, 380	47. 3	42. 4	486
Nebraska	11, 560	10, 174	4, 164	65. 3	57. 5	409
Nevada	749	684	310	30. 0	27. 4	453
New Hampshire	4, 021	3, 541	1, 741	54. 3	47. 9	492
New Jersey	22, 888	20, 392	11, 074	35. 2	31. 4	543
New Mexico	1, 964	1, 699	1, 140	30. 7	26. 5	671
New York	60, 341	54, 844	31, 054	31. 5	28. 7	566
North Carolina	14, 181	13, 014	5, 814	38. 3	35. 2	447
North Dakota	4, 909	4, 563	2, 041	77. 9	72. 4	447
Ohio	48, 059	42, 650	20, 521	49. 4	43. 8	481
Oklahoma	19, 374	17, 213	8, 315	70. 5	62. 6	483
Oregon	13, 518	12, 279	5, 238	64. 4	58. 5	427
Pennsylvania	47, 331	42, 986	24, 398	39. 2	35. 6	568
Rhode Island	4, 876	4, 569	1, 961	50. 3	47. 1	429
South Carolina	4, 720	4, 383	2, 720	26. 8	24. 9	621
South Dakota	5, 198	4, 780	2, 022	66. 6	61. 3	423
Tennessee	18, 449	7, 677	4, 300	53. 0	22. 1	560
Texas	43, 988	37, 778	20, 688	48. 7	41. 8	548
Utah	3, 777	3, 414	1, 439	52. 5	47. 4	421
Vermont	2, 682	2, 488	1, 332	59. 6	55. 3	535
Virginia	10, 062	9, 130	5, 143	30. 2	27. 4	563
Washington	17, 378	16, 016	7, 031	57. 0	52. 5	439
West Virginia	2, 186	1, 992	1, 169	11. 9	10. 8	587
Wisconsin	25, 793	23, 675	10, 713	57. 4	52. 7	453
Wyoming	982	804	365	32. 7	26. 8	454

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[1] U.S. Bureau of the Census: Population estimates. *Current Population Reports.* Series P-25, No. 380. Nov. 1967.

CHAPTER 38

Other Inpatient Health Facilities

Persons who are not necessarily ill or aged are residents of facilities classified by the MFC as "other inpatient health facilities." These house some 348,254 individuals in approximately 3,300 facilities. Included are residential schools or homes for the deaf, blind, physically handicapped, or emotionally disturbed; homes for unwed mothers; orphanages; homes for dependent children; and all facilities for the mentally retarded including hospitals and homes or resident schools.

Information on the nature and extent to which these types of facilities are licensed is being assembled by the National Center for Health Statistics, but the results are not yet available. The information which is available deals with an undifferentiated category of State regulatory or control responsibilities which are described as such rather than as specific functions in the following sections of this chapter. These responsibilities assume different forms in different States and include such functions as approval, inspection, licensing, and certification.

Facilities for the Deaf or Blind

Since the early part of the 19th century, education for the deaf has been a public responsibility in the United States. The first school was founded in Hartford, Conn., in 1817. In 1818, the Institution for the Instruction of the Deaf and Dumb was opened in New York under private auspices. Shortly thereafter, however, it was financed from local public funds. The first State residential school for the deaf was established by Kentucky in 1823 (*71*). Today, in States having public residential schools for the deaf, qualified children are admitted without charge.

The first schools for the blind in the United States were organized between 1829 and 1832 in New York, Pennsylvania, and Massachusetts. Ohio established the first State school for the blind in 1837 (*72*). Today, every State has a residential school for the blind, and/or has special programs in its own public schools, or if neither of these, has contract arrangements with schools for the blind in neighboring States.

The 1960 Census of Population showed 170 homes and schools for the blind and deaf with 18,805 residents (*73*). Data from the 1967 MFC indicated 138 such facilities, with 23,621 residents and 12,674 full-time employees to serve them (tables 163, 164, and 165).

Only four States have responsibilities for the control of homes or schools for the blind, and three States regulate homes or schools for the deaf.

Facilities for Unwed Mothers

One of the first homes for unwed mothers was the Talitha Cumi Maternity Home and Hospital established in Boston in 1836. In the 1850's similar establishments were opened under Catholic auspices in Boston and St. Louis. By 1890 Charles Crittenton had begun to establish a national organization of homes in each State for unwed mothers who sought shelter. During this same period of time, the Salvation Army also provided facilities for the care of unwed mothers. In 1887 "rescue homes" were established in New York, Michigan, and California (*71*). Today, many of the institutions, besides providing domiciliary care for unwed mothers and their children, provide social services and medical care which include prenatal, delivery, and postnatal care within the institution. Often when the institution cannot provide these services, arrangements are made for women to receive such services in the community.

There were 108 homes for unwed mothers with 3,500 residents counted in the 1960 Census of Population (*73*). According to the 1967 MFC there were 181 facilities for unwed mothers, with 5,183 residents and 2,066 full-time employees to serve them (tables 163, 164, and 165).

Forty-eight States regulate homes for unwed mothers. In most States the welfare department is responsible for the regulation of such facilities.

Facilities for the Physically Handicapped

Public institutions for the crippled or physically handicapped were organized at a much later date in the United States than were those for orphans, and deaf, blind, and mentally retarded persons. Until the late 19th century, any care given to the physically handicapped was under private auspices and was limited to refuge. The idea of education and rehabilitation of the handicapped is a relatively modern principle. Between 1897 and 1899 the legislatures of Minnesota and Nebraska enacted the first laws in the Nation for the establishment of State owned and maintained institutions for the physically handicapped (*71*). Today, schools which offer programs in social development, speech, physical, and occupational therapy for persons with orthopedic and other handicaps have been established in a number of States.

In 1967, there were 30 such facilities with 1,345 residents and 1,000 full-time employees (tables 163, 164, and 165).

Four States have rules and regulations that control homes or schools for the physically handicapped._

In October 1967, the Commission on Accreditation of Rehabilitation Facilities, a program of the JCAH, adapted voluntary accreditation standards for rehabilitation facilities.

Facilities for the Mentally Retarded

The first public institution for the mentally retarded in the United States, established in Massachusetts by an 1848 act, was a school for the teaching of "idiots." In 1851 a State school was opened in Albany, N.Y., for the purpose of educating mental defectives. The term "asylum" gradually replaced the term "school" at the turn of the 19th century, and in 1893 the Custodial Asylum for Unteachable Idiots was founded in Rome, N.Y. (*74*). Progress has been made in the care of the mentally retarded. Today, a number of State institutions have changed from large isolated facilities to smaller units closer to the homes of potential patients. They now offer not merely a "custodial" service, but therapeutic services, and are closely linked to appropriate medical, educational, and welfare programs in the community (*75*).

The 1960 Census of Population showed 720 homes and schools for the mentally retarded with a total of 175,000 residents (*73*). In 1967, according to the MFC, there were about 1,500 facilities for the mentally retarded, with 218,871 residents and 113,098 staff members employed full time (tables 163, 164, and 165).

Forty-six States regulate homes for the mentally retarded. In 21 of these States such facilities are regulated by public welfare departments; in 10, by health departments; in eight, by mental health departments; and in seven, by other State agencies.

Facilities for Dependent Children and Orphanages

The first institution established for dependent children was opened by the Order of the Ursuline Sisters in New Orleans around 1730. The first public institution in the United States for dependent children was established by the city of Charleston, S.C., early in the 18th century, and the first State institution, by Massachusetts in 1866. Separate provisions for institutional care of children were made by several large cities after 1816, but usually these institutions were administered by the officials responsible for keeping the almshouses, and were often located on the same grounds. The principal of separate facilities for children was only gradually adopted in the late 19th century (*71*).

The 1960 Census of Population showed almost 1,500 homes for dependent and rejected children, with approximately 73,300 residents (*73*). In 1967, according to the MFC, there were 1,059 homes for dependent children or orphanages, with 58,784 residents being served by 23,695 full-time personnel (tables 163, 164, and 165).

Fory-nine States regulate homes for dependent children. In 39 of these States, the welfare department is the regulating agency.

Other Facilities

Homes for alcoholics, sheltered care homes, boarding homes, correctional facilities, and other similar types of facilities which have health functions are the remaining other inpatient health facilities in the MFC. In 1967 there were 404 such facilities, with 40,450 residents and 11,455 full-time employees to serve them (tables 163, 164, and 165).

There is much variety among the laws of the States regarding the location of the regulating responsibility, the types of facilities subject to regulation, and the requirements for regulation of such facilities.

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(74) Davies, S. P.: *The Mentally Retarded in Society.* New York. Columbia University Press, 1959.

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Table 163. OTHER INPATIENT HEALTH FACILITIES, BY TYPE AND STATE: 1967

Location	Total other inpatient facilities	Deaf or blind	Unwed mothers	Physically handi- capped	Mentally retarded	Orphan- age or dependent children	Other
United States	3, 298	138	181	30	1, 486	1, 059	404
Alabama	29	1	2	1	5	18	2
Alaska	23	—	1	—	7	13	2
Arizona	64	1	4	—	11	11	37
Arkansas	25	3	1	—	8	12	1
California	589	6	8	12	410	42	111
Colorado	42	2	2	—	15	17	6
Connecticut	35	3	2	—	21	6	3
Delaware	13	—	1	—	6	5	1
District of Columbia	19	3	2	—	6	4	4
Florida	65	2	10	—	22	26	5
Georgia	59	4	2	—	16	32	5
Hawaii	27	1	1	—	24	1	—
Idaho	7	1	1	—	3	2	—
Illinois	156	4	9	—	75	59	9
Indiana	59	2	5	—	14	34	4
Iowa	67	2	5	1	45	10	4
Kansas	42	2	2	1	23	13	1
Kentucky	54	2	3	1	8	39	1
Louisiana	56	5	7	1	18	22	3
Maine	33	2	1	1	19	8	2
Maryland	32	2	3	1	15	9	2
Massachusetts	53	5	1	—	24	10	13
Michigan	92	4	4	—	49	32	3
Minnesota	58	3	3	1	42	3	6
Mississippi	23	3	2	—	7	8	3
Missouri	64	5	2	—	32	21	4
Montana	14	1	1	—	3	6	3
Nebraska	30	2	1	—	8	15	4
Nevada	7	—	—	—	2	2	3
New Hampshire	19	1	—	—	6	10	2
New Jersey	74	3	7	1	34	20	9
New Mexico	60	2	1	—	7	13	37
New York	221	19	17	—	87	69	29
North Carolina	70	4	2	1	24	34	5
North Dakota	13	2	2	1	5	2	1
Ohio	174	4	8	1	81	73	7
Oklahoma	57	2	1	—	20	26	8
Oregon	26	2	4	—	13	2	5
Pennsylvania	209	8	5	2	95	87	12
Rhode Island	11	1	1	—	2	5	2
South Carolina	29	1	1	—	5	21	1
South Dakota	29	2	1	—	8	7	11
Tennessee	59	2	5	—	13	36	3
Texas	147	3	19	2	37	75	11
Utah	32	1	—	—	23	5	3
Vermont	13	1	1	—	4	3	4
Virginia	56	2	5	1	16	30	2
Washington	47	2	8	1	19	15	2
West Virginia	28	1	5	—	6	13	3
Wisconsin	80	4	2	—	40	29	5
Wyoming	7	—	—	—	3	4	—

Table 164. RESIDENTS IN OTHER INPATIENT HEALTH FACILITIES BY TYPE AND STATE: 1967

Location	Total other inpatient facilities	Deaf or blind	Unwed mothers	Physically handi-capped	Mentally retarded	Orphanage or dependent children	Other
United States	348, 254	23, 621	5, 183	1, 345	218, 871	58, 784	40, 450
Alabama	3, 626	70	81	38	2, 360	961	116
Alaska	505	—	10	—	244	248	3
Arizona	12, 914	357	59	—	1, 182	477	10, 839
Arkansas	1, 893	477	35	—	335	681	365
California	22, 854	1, 196	285	327	16, 331	1, 713	3, 002
Colorado	3, 816	312	131	—	2, 277	657	439
Connecticut	5, 692	619	66	—	4, 583	333	91
Delaware	868	—	20	—	697	142	9
District of Columbia	999	58	49	—	93	677	122
Florida	7, 333	773	180	—	5, 186	1, 129	65
Georgia	4, 885	1, 036	80	—	2, 041	1, 575	153
Hawaii	1, 026	53	30	—	938	5	—
Idaho	979	150	24	—	748	57	—
Illinois	17, 396	718	507	—	12, 254	3, 552	365
Indiana	6, 890	807	115	—	4, 288	1, 616	64
Iowa	4, 591	299	90	6	3, 574	454	168
Kansas	3, 310	385	26	190	2, 389	312	8
Kentucky	3, 616	415	60	64	1, 471	1, 481	125
Louisiana	5, 397	756	228	160	3, 021	1, 009	223
Maine	2, 001	160	40	—	1, 385	237	179
Maryland	8, 291	620	180	13	7, 062	397	19
Massachusetts	8, 155	621	35	—	6, 139	616	744
Michigan	14, 668	595	121	—	12, 489	1, 235	228
Minnesota	10, 248	423	92	51	9, 399	37	246
Mississippi	2, 836	447	59	—	1, 239	525	566
Missouri	5, 384	697	36	—	3, 509	717	425
Montana	1, 767	85	25	—	954	569	134
Nebraska	4, 656	224	28	—	2, 902	1, 339	163
Nevada	126	—	—	—	14	98	14
New Hampshire	1, 678	100	—	—	1, 178	355	45
New Jersey	7, 695	499	204	42	5, 346	1, 267	337
New Mexico	8, 216	335	16	—	646	550	6, 669
New York	42, 724	2, 078	505	—	30, 692	6, 539	2, 910
North Carolina	8, 104	1, 268	77	77	3, 912	2, 648	122
North Dakota	1, 777	118	46	65	1, 371	85	92
Ohio	17, 658	575	334	33	11, 994	3, 907	815
Oklahoma	6, 175	337	34	—	2, 821	1, 924	1, 059
Oregon	4, 617	298	134	—	3, 114	66	1, 005
Pennsylvania	24, 216	1, 211	91	190	15, 820	5, 211	1, 693
Rhode Island	728	85	22	—	110	393	118
South Carolina	4, 971	469	42	—	3, 017	1, 387	56
South Dakota	5, 166	177	14	—	1, 324	1, 027	2, 624
Tennessee	5, 388	541	131	—	2, 373	2, 278	65
Texas	18, 103	805	476	48	11, 249	5, 029	496
Utah	3, 360	177	—	—	486	147	2, 550
Vermont	1, 110	101	20	—	708	142	139
Virginia	6, 368	756	104	24	3, 877	1, 481	126
Washington	1, 443	437	89	17	585	295	20
West Virginia	2, 115	332	94	—	916	380	393
Wisconsin	9, 136	569	58	—	7, 587	681	241
Wyoming	784	—	—	—	641	143	—

Table 165. FULL-TIME EMPLOYEES IN OTHER INPATIENT HEALTH FACILITIES BY TYPE AND STATE: 1967

Location	Total other inpatient facilities	Deaf or blind	Unwed mothers	Physically handi-capped	Mentally retarded	Orphanage or dependent children	Other
United States	163, 988	12, 674	2, 066	1, 000	113, 098	23, 695	11, 455
Alabama	1, 224	8	53	28	707	380	48
Alaska	219	—	2	—	135	64	18
Arizona	2, 679	154	26	—	538	129	1, 832
Arkansas	896	243	5	—	217	181	250
California	16, 952	630	118	98	14, 354	833	919
Colorado	2, 240	132	44	—	1, 416	330	318
Connecticut	3, 016	337	23	—	2, 456	138	62
Delaware	470	—	14	—	392	60	4
District of Columbia	677	62	22	—	56	497	40
Florida	4, 494	356	44	—	3, 690	385	19
Georgia	2, 054	369	17	—	1, 166	456	46
Hawaii	525	45	10	—	468	2	—
Idaho	482	76	6	—	379	21	—
Illinois	9, 060	540	228	—	6, 623	1, 509	160
Indiana	3, 387	399	39	—	2, 361	575	13
Iowa	2, 149	256	30	3	1, 497	294	69
Kansas	2, 459	184	7	332	1, 819	114	3
Kentucky	1, 635	213	17	25	931	420	29
Louisiana	3, 089	337	117	96	2, 132	347	60
Maine	1, 024	108	12	4	745	91	64
Maryland	4, 214	237	79	6	3, 687	196	9
Massachusetts	3, 785	327	21	—	2, 822	341	274
Michigan	6, 862	262	39	—	5, 940	547	74
Minnesota	4, 460	223	32	40	3, 882	12	271
Mississippi	772	111	31	—	428	127	75
Missouri	2, 593	435	11	—	1, 655	283	209
Montana	578	44	8	—	364	148	14
Nebraska	1, 634	123	24	—	767	648	72
Nevada	66	—	—	—	5	52	9
New Hampshire	628	60	—	—	464	86	18
New Jersey	4, 620	274	55	22	3, 747	346	176
New Mexico	2, 139	195	3	—	431	158	1, 352
New York	21, 430	1, 533	234	—	14, 073	4, 246	1, 344
North Carolina	4, 084	589	30	16	2, 649	758	42
North Dakota	742	71	15	70	481	23	82
Ohio	6, 515	178	152	38	4, 055	1, 566	526
Oklahoma	2, 869	208	14	—	1, 756	590	301
Oregon	1, 853	190	59	—	1, 369	53	182
Pennsylvania	11, 847	963	41	160	7, 638	2, 336	709
Rhode Island	428	74	16	—	53	240	45
South Carolina	1, 635	211	7	—	1, 066	338	13
South Dakota	1, 339	80	5	—	500	271	483
Tennessee	2, 493	274	35	—	1, 460	704	20
Texas	7, 231	437	218	21	4, 716	1, 514	325
Utah	724	110	—	—	133	21	460
Vermont	476	62	7	—	285	44	78
Virginia	2, 362	337	23	7	1, 499	463	33
Washington	850	227	37	34	296	253	3
West Virginia	762	161	28	—	282	122	169
Wisconsin	4, 879	229	8	—	4, 204	305	133
Wyoming	387	—	—	—	309	78	—

APPENDIX

List of Health Occupations

About 125 health occupations are identified by title on the attached pages. The list also shows approximately 250 alternate titles such as synonyms or designations related to form of practice, type of specialty, or place of practice. The titles were compiled by the Division of Allied Health Manpower, Bureau of Health Manpower.

For an occupation to be designated as a "health occupation," it is required that the workers have special education or training designed to help them function in a health setting. An attempt has been made to standardize the terminology in relation to various levels of education and training, although it is recognized that usage in the employment market precludes such direct impact. However, it is hoped that the primary titles listed here may have some influence on nomenclature in education and training programs and may also help the reader understand the relationship of occupations within a given health field.

In our usage, "technologist" or "therapist" as a primary title indicates at least the baccalaureate level of preparation. "Technician" or "assistant" indicates the associate degree (2 years of college education or other formal preparation beyond high school). "Aide" indicates on-the-job training or specialized training of less than 2 years duration after high school. Some health fields already have three occupations identified by these distinctive titles. In other health fields where it is known that plans are being developed, the three levels appear on the attached list.

Although approximately 375 titles appear on the list, the inventory omits some workers within the health services industry. There are many business, clerical, and maintenance occupations that are essential but not unique to the industry since no special education or formal training for the health field is required. Among such titles are accountants, admitting officers, business managers, cashiers, comptrollers, credit managers, directors of office services, directors of volunteer services, employment interviewers, employment managers, housekeepers and housekeeping workers, job analysts, laundry managers and workers, maintenance workers, personnel directors and office workers, public relations directors, purchasing agents, stationary engineers, and stockroom managers.

The health occupations have been grouped into 32 fields, instead of the 35 that appear in the manpower chapters (pt. I) of *Health Resources Statistics, 1968*. For example, the sciences are grouped here under three headings—mathematical, natural, and social—as used in the National Register developed by the National Science Foundation. Also a few occupations in this list have not been mentioned in the text.

LIST OF HEALTH OCCUPATIONS

Primary title (*1*)	*Alternate title*
1. ADMINISTRATION:	
Health administrator	Health officer or commissioner.
	Environmental control administrator.
	Health agency executive director.
	Health care administrator.
	Hospital administrator.
	Medical care administrator.
	Nursing home administrator.
	Public health administrator.
Health program analyst	Public health analyst.
	Public health specialist.
Health program representative	Public health advisor.
	Public health representative.
Health systems analyst	
2. BIOMEDICAL ENGINEERING:	
Biomedical engineer	Bioengineer.
	Medical engineer.
Biomedical engineering technician	Medical engineering technician.
Biomedical engineering aide	
3. CHIROPRACTIC AND NATUROPATHY:	
Chiropractor	Doctor of chiropractic.
Naturopath	Naturopathic physician.
4. CLINICAL LABORATORY SERVICES (*2*):	
Clinical laboratory scientist (*3*)	Clinical chemist (*3*).
	Microbiologist (*3*).
Clinical laboratory technologist	Medical laboratory technologist.
	Medical technologist.
	Blood banking technologist.
	Chemistry technologist.
	Hematology technologist.
	Microbiology technologist.
	Nuclear medical technologist.
Clinical laboratory technician	Medical laboratory technician.
	Medical technician.
	Cytotechnician.
	Cytotechnologist.
Clinical laboratory aide	Laboratory assistant.
	Certified laboratory assistant.
	Histologic aide.
	Histologic technician.
	Pathology laboratory aide.
5. DENTISTRY AND ALLIED SERVICES:	
Dentist	Endodontist.
	Oral pathologist.
	Oral surgeon.
	Orthodontist.
	Pedodontist.
	Periodontist.
	Prosthodontist.
	Public health dentist.
Dental hygienist	
Dental assistant	
Dental laboratory technician	Dental laboratory assistant (aide).

LIST OF HEALTH OCCUPATIONS—Continued

Primary title (1)	*Alternate title*
6. DIETETIC AND NUTRITIONAL SERVICES:	
Dietitian	Administrative dietitian. Consultant (public health) dietitian. Research dietitian. Teaching dietitian. Therapeutic dietitian.
Nutritionist (*3*)	Public health nutritionist.
Dietary technician	Dietary (food service) assistant. Food service manager. Food service technician.
Dietary aide	Dietary (food service) worker.
Food service supervisor	
7. ENVIRONMENTAL CONTROL (*4*):	
Environmental scientist (*3*)	Sanitary sciences specialist (*3*). Air pollution meteorologist (*3*). Environmental control chemist (*3*). Estuarine oceanographer (*3*). Ground water hydrologist (*3*). Health physicist (*3*). Limnologist (*3*).
Environmental engineer	Sanitary engineer. Air pollution engineer. Hospital engineer. Industrial hygiene engineer. Public health engineer. Radiological health engineer.
Environmental technologist	Sanitarian. Air pollution specialist. Industrial hygienist. Radiological health specialist.
Environmental technician	Sanitarian technician. Environmental engineering technician. Radiological health technician (monitor).
Environmental aide	Sanitarian aide. Environmental engineering aide. Sewage plant assistant. Waterworks assistant.
8. FOOD AND DRUG PROTECTIVE SERVICES:	
Food technologist	
Food and drug inspector	
Food and drug analyst	
9. HEALTH EDUCATION:	
Health educator	Community health educator. Public health educator. School health coordinator. School health educator.
Health education aide	
10. INFORMATION AND COMMUNICATION:	
Health information specialist	Biomedical communication specialist.
Health science writer	Medical writer.
Health technical writer	Medical technical writer. Medical editor.
Medical illustrator	Medical photographer.
11. LIBRARY SERVICES:	
Medical librarian	
Medical library assistant	
Hospital librarian	Patients' librarian.

LIST OF HEALTH OCCUPATIONS—Continued

Primary title (1)	*Alternate title*
12. MATHEMATICAL SCIENCES (*4*):	
Mathematician	Biomathematician. Demographer.
Statistician	Biostatistician. Health statistician. Vital record registrar.
13. MEDICAL RECORDS:	
Medical record librarian	Medical record specialist. Medical record technologist.
Medical record technician	Medical record assistant.
Medical record clerk	Medical record aide.
14. MEDICINE AND OSTEOPATHY:	
Physician	Doctor of medicine—M.D.
Osteopathic physician	Doctor of osteopathy—D.O.
M.D. or D.O	Allergist. Anesthesiologist. Aviation medicine specialist. Cardiovascular disease specialist. Colon and rectal surgeon (proctologist). Dermatologist. Forensic pathologist. Gastroenterologist. General practitioner. Gynecologist. Internist. Manipulative therapy specialist. Neurological surgeon. Neurologist. Occupational medicine specialist. Obstetrician. Ophthalmologist. Orthopedic surgeon. Otolaryngologist (otorhinolaryngologist). Pathologist. Pediatrician (*5*). Physiatrist (physical medicine and rehabilitation specialist). Plastic surgeon. Preventive medicine specialist. Psychiatrist (*6*). Public health physician. Pulmonary disease specialist. Radiologist (*7*). Surgeon. Thoracic surgeon. Urologist. Intern. Resident. Fellow.
15. MIDWIFERY:	
Midwife	Lay midwife. Nurse midwife (*8*).

LIST OF HEALTH OCCUPATIONS—Continued

Primary title (1)	*Alternate title*
16. NATURAL SCIENCES (*4*):	
Anatomist	Cytologist. Embryologist. Histologist.
Botanist	
Chemist	Bioanalyst. Biochemist. Clinical chemist (*9*). Environmental control chemist (*10*).
Ecologist	
Entomologist	
Epidemiologist	
Geneticist	
Hydrologist	Ground water hydrologist (*10*).
Immunologist	
Meteorologist	Air pollution meteorologist (*10*).
Microbiologist (*9*)	Bacteriologist. Mycologist. Parasitologist. Virologist.
Nutritionist (*11*)	
Oceanographer	Estuarine oceanographer (*10*).
Pathologist	
Pharmacologist	Toxicologist.
Physicist	Biophysicist. Health physicist (*10*).
Physiologist	
Sanitary sciences specialist (*10*)	
Zoologist	Limnologist (*10*).
17. NURSING AND RELATED SERVICES:	
Nurse	Registered nurse—R.N. Graduate nurse. Professional nurse. Hospital nurse. Occupational health(industrial) nurse. Office nurse. Private duty nurse. Public health nurse. School nurse. Nurse anesthetist. Nurse midwife (*12*). Obstetrical nurse. Pediatric nurse. Psychiatric nurse. Surgical (operating room) nurse.
Practical nurse	Licensed practical nurse. Vocational nurse. Licensed vocational nurse.
Nursing aide Orderly Attendant	Nursing assistant. Psychiatric (mental health) aide.
Home health aide	Home aide—homemaker. Visiting health aide.
Ward clerk	Floor clerk.
18. OCCUPATIONAL THERAPY:	
Occupational therapist	
Occupational therapy assistant	Occupational therapy technician.
Occupational therapy aide	

LIST OF HEALTH OCCUPATIONS—Continued

Primary title (1)	*Alternate title*
19. ORTHOTIC AND PROSTHETIC TECHNOLOGY:	
Orthotist	Orthopedic brace maker.
Orthotic aide	
Prosthetist	Artifical limb maker.
Prosthetic aide	
Restoration technician	
20. PHARMACY:	
Pharmacist	Community pharmacist. Hospital pharmacist. Industrial pharmacist.
Pharmacy aide	Pharmacy helper.
21. PHYSICAL THERAPY:	
Physical therapist	
Physical therapy assistant	Physical therapy technician.
Physical therapy aide	
22. PODIATRY:	
Podiatrist	Chiropodist. Foot orthopedist. Foot roentgenologist. Podiatric surgeon. Pododermatologist.
23. RADIOLOGIC TECHNOLOGY:	
Radiologic technologist	
Radiologic technician	X-ray technician. Nuclear medical technician. Radiation therapy technician.
24. SECRETARIAL AND OFFICE SERVICES (*4*):	
Secretary	Dental secretary. Medical secretary.
Office assistant	Dentist's office assistant. Medical assistant. Optometrist's office assistant. Physician's office assistant.
25. SOCIAL SCIENCES (*4*):	
Anthropologist	Cultural (social) anthropologist. Physical anthropologist.
Economist	Health economist.
Psychologist	Clinical psychologist. Counseling psychologist. Measurement psychologist (psychometrist). Social psychologist.
Sociologist	Medical sociologist.
26. SOCIAL WORK:	
Clinical social worker	Medical social worker. Psychiatric social worker.
Clinical social work assistant	
Clinical social work aide	Clinical casework aide.
27. SPECIALIZED REHABILITATION SERVICES:	
Corrective therapist	
Corrective therapy aide	
Educational therapist	
Manual arts therapist	
Music therapist	
Recreation therapist	Therapeutic recreation specialist.
Recreation therapy aide	
Homemaking rehabilitation consultant	
28. SPEECH PATHOLOGY AND AUDIOLOGY:	
Audiologist	Hearing therapist.
Speech pathologist	Speech therapist.

LIST OF HEALTH OCCUPATIONS—Continued

Primary title (*1*)	*Alternate title*
29. VETERINARY MEDICINE:	
Veterinarian	Laboratory (animal medicine) veterinarian.
	Public health veterinarian.
	Veterinary laboratory diagnostician.
	Veterinary microbiologist.
	Veterinary pathologist.
	Veterinary radiologist.
	Veterinary surgeon.
	Veterinary toxicologist.
Veterinary technician	Animal technician.
30. VISION CARE:	
Ophthalmologist (*13*)	
Optometrist	
Vision care technologist	Ocular care technologist.
	Ophthalmic technologist.
	Optometric technologist.
Technician:	
Vision care technician	Ocular care technician.
	Ophthalmic technician (assistant).
	Optometric technician (assistant).
Orthoptic technician	Orthoptist.
Optician	Dispensing optician.
	Ophthalmic dispenser (optical fitter).
	Contact lens technician.
	Lens grinder-polisher (*14*).
	Optical (laboratory) mechanic.
Visual care aide	Ocular care aide.
	Ophthalmic aide.
	Optometric aide.
	Visual training aide.
31. VOCATIONAL REHABILITATION COUNSELING:	
Vocational rehabilitation counselor	Rehabilitation counselor.
32. MISCELLANEOUS HEALTH SERVICES:	
Physician's associate (*15*)	Pediatric associate.
Physician's assistant	Orthopedic assistant.
Physician's aide	Obstetrical aide.
	Pediatric aide.
	Surgical aide.
Community health aide	School health aide.
	Dental health aide.
	Mental health aide (worker).
Medical machine technician	Biomedical equipment technician.
	Cardiopulmonary technician.
	Electrocardiograph technician.
	Electroencephalograph technician.
Miscellaneous health workers:	
Extracorporeal circulation specialist	
Inhalation therapist (technician)	
Inhalation therapy aide	
Medical emergency technician	
Ambulance attendant (aide)	

REFERENCES

(*1*) The occupations listed are those which make a significant contribution to the health field and for which individuals have developed specialized competence.

(*2*) Includes pathology laboratory.

(*3*) See Natural Sciences.

(*4*) For some of the occupations listed, only a minority of the workers may be engaged in health related work.

(*5*) Includes specialists in pediatric allergy and cardiology.

(*6*) Includes specialists in child psychiatry.

(*7*) Includes specialists in diagnostic and therapeutic radiology.

(*8*) See Nursing and Related Services.

(*9*) See Clinical Laboratory Services.

(*10*) See Environmental Control.

(*11*) See Dietetic and Nutritional Services.

(*12*) See Midwifery.

(*13*) See Medicine and Osteopathy.

(*14*) Also known as assembler, benchman, edger, or surfacer; optical technician or shopman.

(*15*) Baccalaureate or higher educational background.

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